**Management protocol**

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| Sector/ TOPIC: Fauna  Components: MARINE REPTILES, CARETTA CARETTA AND CHELONIA MYDAS | | |
| *TITLE: STRATEGIC BLUEPRINT FOR SAFEGUARDING MARINE TURTLES IN TCNR* | | |
| tARGET AREA (geographical position): TCNR and Tyre Coastal Zone | | |
| FREQUENCY: Daily | | |
| **MONITORING RATIONALE (System Component)** | | Loggerhead turtles (*Caretta caretta,* Linnaeus 1758) in the Mediterranean primarily choose nesting sites in Turkey, Greece, Cyprus, and Libya, as documented by Margaritoulis et al. (2003) and Laurent (1998). In contrast, there are significantly fewer nesting occurrences on the coasts of Lebanon, Palestine, Israel, Egypt, and Tunisia.  Nesting sea turtles in the Eastern Mediterranean face increasing threats from human intervention. Coastal development, beachfront tourism, and fishing activities have all contributed to the degradation of crucial nesting habitats for these endangered species (Margaritoulis, D., & Panagopoulou, A. 2018).  The Mediterranean hosts the prevalent sea turtle species, the loggerhead turtle (*Caretta caretta*), facing a significant threat to its preservation primarily from accidental captures during fishing activities. Italian waters alone witness an alarming estimate of over 50,000 capture incidents, resulting in a potential 10,000 fatalities. Unfortunately, our understanding of sea turtle interactions with fishing gear and the effective application of measures to reduce these incidents remains limited. This knowledge gap hampers efforts to mitigate the decline in sea turtle populations across the Mediterranean. (Lucchetti et al., 2019).  The species is classified as LC in the Mediterranean Sea basin (IUCN 2022), and as VU at the global level (IUCN 2015). Compared to *Caretta caretta*, much less is known about green turtles (*Chelonia mydas*), for which only a general overview of the ecology and conservation status exists. The Mediterranean subpopulation of loggerhead turtles was downgraded in 2015 to Least Concern (LC) from Endangered (EN) according to the IUCN red list criteria. The species belongs to the same IUCN red list category at the global level.  The turtles’ survival is threatened by intentional and unintentional human actions presents both intentional and unintentional. Intentional threats include continued hunting, poaching and egg harvesting. Unintentional threats include boat strikes, fishermen's nets that lack turtle excluder devices, pollution and habitat destruction. Light pollution may disorient hatchlings.  Surveys conducted along the entire coastline of Lebanon revealed that nesting activities were not evenly distributed. In some sections of the northern coast, nesting was sparse, and on several developed beaches, it was scattered. However, the nesting sites in the southern region were found to be of greater significance both at a national and regional level. Loggerhead turtles are prevalent along the Lebanese coast, and there is specific  sites with moderate nesting densities across the coastal belt of Lebanon. On the other hand, the green turtle is less common, and their nesting is limited to the less developed areas in the south of the country (Cross et al., 2006). Moreover, the western area of the Mediterranean Sea, included Lebanon, represents the major nesting site of *Chelonia mydas* and stable nesting site of *Caretta caretta* (Figure 1).  Figure 1 Species nesting in the Mediterranean, IUCN 2020  The nesting locations in southern Lebanon are found initially in Al Mansouri, classified as first-rate, and then in TCNR. The nesting sites of marine turtles in TCNR are located in scientific zone (protected zone) more than other zones (Figure 2). This nesting sites are vulnerable to harm due to human activities, such as light pollution, pollution, bycatch and boat strike.  Consequently, there is an urgent need for conservation strategy to safeguard this nesting area.  C:\Users\raghda saad\Desktop\Map.jpgFigure 2 TCNR Nature Reserve with its zonation. |
| **MONITORING GOAL** | | The main objective of this protocol is to investigate the main threats for *Caretta caretta* and *Chelonia mydas* along the TCNR marine and coastal areas and evaluate the level of impacts for each of the threats, in order to elaborate – with the stakeholders – strategies, mitigation initiatives and synergies with similar and ongoing projects.  This protocol will contribute to:  A) detect the most effective management plan for the turtles’ nesting sites of TCNR.  B) collecting functional information to better detect and quantify unintentional turtle captures (bycatch) in fishing gear. |
| **LABORATORY ANALYSIS NEEDS** | | - |
| **DATA ANALYSIS AND INTERPRETATION PROTOCOLS** | | Data will be entered into the ISP system after daily monitoring to the fishing ground by TCNR, with responsibility shared between the Project Manager and the Technical team. The table will contain the following variables: locality, year, month, day, boat registration, fishermen’s name, fishing gear, Total catch (Kg), classification of landed species caught, records of accidents, such as turtle’s bycatch.  The outcome of this data will spread and communicate on the website of TCNR and with publish an informative publications and scientific articles. |
| DSS System Diagram & INDICATORS | | |
| **DIAGRAM ELEMENT:**  Animal Species (Id=10)    [Marine Reptiles (Id=1095)]     |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Marine Reptiles (Id=1095)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Nesting Marine Reptiles | Number of nests of turtles | TCNR | Yearly |  | | Caretta caretta | Number of nests and hatched eggs | TCNR | Yearly |  | | Chelonia mydas | Number of nests and hatched eggs | TCNR | Yearly |  |   [Fisheries (Id=1104)]     |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Fisheries (Id=1104)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Economic value ($/125 m2) of local fish | For each fish species |  |  |  | | Catch (tons) |  |  |  |  | | Economic value ($/Kg) of imported fish | For each species |  |  |  | | Bycatch | Occurrence of unintentional catch of marine turtles during the fishing activities |  |  |  | | Fishing effort | (formula to be added) |  |  |  | | | |
| Data Collection Procedure | | |
| Staff | TCNR Team, Tyre Municipality and Tyre Fish syndicate, Monitors (5) | |
| Equipment | Record Sheet (field monitoring sheet) | |
| Protocol | This protocol is founded upon a structured methodology that encompasses several crucial phases, each playing a fundamental role in ensuring successful engagement with fishermen. The process entails establishing trust, enhancing awareness and education, providing training on effective bycatch identification and reporting, and maintaining regular feedback and communication loops.  The TCNR team, in collaboration with Tyre municipality, is arranging a series of meetings with fishermen. The objective is to showcase the project's objectives, highlight the criticality of safeguarding turtles, and emphasize the value of collaborative efforts. These gatherings are set to occur over the coming two months, targeting the participation of 400 fishermen. In each weekly meeting (three hours), 50 fishermen will be engaged to facilitate an open dialogue regarding the significance of marine conservation and how their proactive engagement can have a meaningful impact. This consistent transparency week after week will play a crucial role in establishing a foundation of trust between all parties involved.  During our planned meetings, we will present a variety of informative materials to engage the fishermen and shed light on crucial aspects of sea turtle conservation:   * Statistics and video’   We will showcase extensive data and statistics derived from a comprehensive survey conducted by TCNR regarding turtle nesting. This data will illustrate the discernible decline in nesting activity from 2013 to 2016, providing a factual basis for understanding the urgency of conservation efforts. Furthermore, we will present videos sourced from Facebook illustrating the adverse effects of fishing gear on turtles, highlighting the negative impacts caused by such equipment.   * Illustrative Narratives and Noteworthy Cases (Videos and Images)   We will feature compelling success stories and case studies that exemplify the active involvement of fishermen in the sea turtle conservation process. Notable examples include the inspiring roles played by fishermen as Sea Turtle Guardians in Bahia Magdalena (Mexico), their instrumental engagement in Bycatch Mitigation in Costa Rica, and their proactive implementation of Turtle Excluder Devices (TEDs) in the USA.   * Exploring Economic Benefits through Eco-Tourism   We intend to engage in a meaningful dialogue with the fishermen, focusing on how the conservation of marine turtles directly influences their financial prospects through eco-tourism. By drawing examples from successful eco-tourism models in various countries, we aim to emphasize the potential economic gains that can be achieved by responsibly promoting turtle-related tourism activities.  At the end of every meeting, we will inform participants that subsequent to these discussions, a joint survey will be launched in collaboration with fishermen, Tyre Municipality, and Tyre Fish Syndicate. This survey aims to collaboratively work towards the preservation of marine turtles in Tyre, while also assisting fishermen in exploring opportunities for eco-tourism investment and environmental conservation.  Following meetings with the fishermen, TCNR will organize training sessions for designated monitors from Tyre Municipality and the Fishing Syndicate in Tyre. These sessions will emphasize precise completion of the data sheet, and they will be conducted in a single day. The monitors will begin their daily duties early in the morning as fishermen return to the fishing port (for one year).    This sheet and protocol serve various purposes for Tyre and TCNR. Initially, they aid in identifying if bycatch significantly impacts turtles and quantifying the overall catch, vital for marine research and species categorization. Based on outcomes, we can formulate protocols to mitigate turtle bycatch or address other contributing factors such as lighting and human activities (e.g., trampling). | |
| Quotations | * Meetings with fishermen weekly: 400$\*8= 3200$ * Monthly salary for monitor’s: 500$\*5= 2500$ | |
| **References:**  Cross, H., Khalil, M. Rizk, C. Venizelos, L. 2010. Marine Turtle Conservation in the Mediterranean Population Status and Conservation Activities on Sea Turtle Nesting Beaches in South Lebanon, 2005.  *Lucchetti, A., Bargione, G., Petetta, A., Vasapollo, C., & Virgili, M. (2019).* Reducing sea turtle bycatch in the Mediterranean mixed demersal fisheries. Frontiers in Marine Science, 6(JUL), 1–12. https://doi.org/10.3389/fmars.2019.00387  Margaritoulis, D., and Panagopoulou, A. 2018. Sea turtles in the Mediterranean: Distribution, threats, conservation priorities, and challenges. In The Biology of Sea Turtles (Vol. III, pp. 435-464). CRC Press.  Margaritoulis, D., Argano, R., Baran, I., Bentivegna, F., Bradai, M.N., Caminas, J.A., Casale, P., De Metrio, G., Demetropoulus, A., Gerosa, G., Godley, B.J., Haddoud, D.A., Houghton, J., Laurent, L., and Lazar, B. (2003) Loggerhead turtles in the Mediterranean Sea: present knowledge and conservation perspectives. In, A.B. Bolten, B.E. Witherington (eds). Loggerhead Marine turtles. Smithsonian Institution Press, Washington D.C., pp175-198 | | |