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AND NATURAL HABITATS

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CONSERVATION OF MARINE TURTLE NESTING SITES: A GUIDANCE TOOL

Providing guidance in the Contracting Parties Cyprus, Greece and Türkiye

[working title]

-DRAFT-

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* Sections that relate to marine turtles conservation were drafted by Paolo Casale. Sections relating to Integrated Coastal Zone Management and Marine Spatial Planning were drafted by Ivica Trumbic.

EXECUTIVE SUMMARY

[drafting note: to be added at a later stage]

1. INTRODUCTION

The Standing Committee of the Bern Convention decided at its 40th plenary in December 2020 to launch an initiative for the conservation of marine turtles. This decision is motivated by the lack of progress in the numerous and long-standing case-files under the Bern Convention involving marine turtle nesting sites.

The Bern Convention's case-file system, dating back to 1984, is a unique monitoring tool which stems from a decision taken by the Bern Convention's Standing Committee.

Thanks to the case-file system, NGOs or private citizens can submit complaints for possible breaches of the Convention by Contracting Parties (the countries that have ratified the Bern Convention). The complaints so received are processed by the Secretariat, the Bureau and, when particularly relevant, also by the Standing Committee. The analysis of case-files is conducted on the basis of reports submitted by the NGO/citizen (the complainant) and the Contracting Party (the respondent country). For how long a case-file remains on the agenda strongly varies and depends on the rapidity and quality of progress made from the side of the Contracting Party regarding the matter of the complaint.

The initiative on marine turtle conservation, which forms the basis for the Guidance tool at hand, focuses on five case-files on marine turtle conservation in Cyprus[1], Greece[2] and Türkiye[3], (hereby case-files). In all cases, the complainants are non-governmental organizations: MEDASSET, ARCHELON, Terra Cypria and MERÇED. The case-files have a very broad range with regard to how long they have remained on the Bern Convention's agenda. The oldest case originates in 1986 and the newest in 2019.

In all five case-files, *Caretta caretta*, is the main sea turtle species of concern and some cases other species are threatened, include *Chelonia mydas* too. Both species are listed under Appendix II of the Bern Convention. Complainants of the five case-files identified excessive tourism development and its consequences (construction of - sometimes illegal - buildings in proximity to nesting areas, littering, light pollution, unregulated water sports, presence of people, vehicles and beach furniture on nesting beaches at night) as the main threat to sea turtles and their natural habitats. In some cases[4], an additional factor endangering the turtles is fishery with the use of nets and incidental turtle-catches. Further, inadequate or insufficient legal protection of the marine turtles and their habitats or an inadequate implementation of such protection is believed to threaten the habitat and species concerned. This dynamic is enhanced by a lack of education and public awareness on the needs of marine turtles[5].

Over the life-cycle of four[6] of the five case-files, the Standing Committee of the Bern Convention mandated on-the-spot-appraisals of external experts to the sites concerned. The on-the-spot appraisals resulted in the adoption by the Standing Committee of site-specific Recommendations[7]. Despite the Recommendations, improvements on the case-files were considered insufficient by the Standing Committee to declare them closed.

[1] 1995/6: Cyprus: Akamas peninsula.
[2] 1986/8: Greece: Recommendation No. 9 (1987) on the protection of Caretta Caretta in Laganas bay, Zakynthos and 2010/5: Greece: threats to marine turtles in Thines Kiparissias.
[3] 2012/9: Türkiye: Presumed degradation of nesting beaches in Fethiye and Patara SPAs and 2019/5: Türkiye: Habitat destruction in Mersin Anamur Beach
[4] 2012/9 Türkiye, 1986/8 Greece, 05/2010 Greece.
[5] 09/2012 Türkiye; 05/2010 Greece; 06/1995 Cyprus.
[6] 09/2012 Turkey, 05/2010 Greece, 1986/8 Greece, 06/1995 Cyprus.
[7] *Recommendation No. 7 (1987) ; Recommendation No. 9 (1987), Recommendation No. 63 (1997) Recommendation No. 66 (1998), Recommendation No. 174 (2014, Recommendations No. 182 (2015) ; Recommendations No. 183 (2015), Recommendation No. 191 (2016)*

In spite of the efforts put in place over decades by all stakeholders and by the Bern Convention, the progress made so far was not considered to be sufficient to close the case-files. In order to provide new impetus to efforts to find solutions for the case files, a Bern Convention initiative for the conservation of marine turtles was brought into life in 2021. Its aim is to explore new complementary ways of supporting the Contracting Parties Cyprus, Greece and Türkiye in finding a solution to the pending marine turtle cases and to prevent further marine turtle complaints. By understanding the reasons for the limited progress made, a central aim of the initiative is the provision of a guidance tool to the Contracting Parties, which is presented under section 6 of this paper.

2.THE BERN CONVENTION INITIATIVE FOR THE CONSERVATION OF MARINE TURTLES

As stated in the introduction, the Bern Convention initiative on the conservation of marine turtles aims to support the Bern Convention's Contracting Parties in solving their pending case-files related to marine turtle conservation and prevent the upcoming of new complaints. To do so, all related case-file reports were analysed and national consultations with relevant stakeholders were held. Additionally, the Guidance tool hereby presented were drafted as an output of this initiative.

Drafting note: graphic illustration of the species concerned and scope of the initiative to be developed

2.1 Objectives of the initiative

The general approach of the initiative is to tackle the ongoing problems at the origin of the case-files from a different perspective that can support and complement the current approach. In this respect, the same stakeholders are both the source of information and the target for the possible results. The specific objectives of the initiative are:

- Understanding the reasons for the lack of progress in the numerous and long-standing case-files under the Bern Convention involving marine turtle nesting sites in the Contracting Parties Cyprus, Greece and Türkiye;
- Identifying any promising alternative or complementary approach for the adherence to the Convention;
- Providing a guidance toolbox that can help all stakeholders to identify problems and solutions and that can help the Standing Committee of the Bern Convention and its Bureau to monitor the case-files.

These objectives have been pursued through the following activities:

- Analyse of case-files reports to identify the reasons why the case-files are not being solved. Reports were compared in terms of potential differences among different stakeholders and across years.
- Meet stakeholders to identify obstacles to the implementation of the previous Recommendations. Online meetings were organized with different stakeholders (government, civil society, business sector) separately and jointly. As a facilitating and supporting tool, stakeholders were also asked to compile a questionnaire.
- Analyse well-known nesting site cases, representing a range of different conservation statuses. This was to understand the relation among the monitored variables and conservation measures most typically used or mentioned by the stakeholders when presenting their evaluation of the conservation status of a nesting site. A specific team of nine experts was assembled for this activity.
- Set up of an *ad hoc* Working Group comprising relevant representatives of Contracting Parties to the Bern Convention as well as relevant Observers to the Bern Convention. This activity is mainly aimed at providing advice and guidance for facilitating a multi-

stakeholder consensus building process and giving recommendations for the drafting of the present Guidance tool.

2.2 Main findings of the case-file reports

A few general patterns emerged from the reports of the five case-files (Türkiye: Fethiye and Patara; Türkiye: Mersin-Anamur; Greece: Thines Kiparissias; Greece: Zakynthos; Cyprus: Akamas peninsula):

- The reports by both Complainants and Government tend to remain similar from year to year, denoting little change perceived or declared by each party.
- The reports by the Complainants tend to claim that the Standing Committee Recommendations have not been fulfilled by the Government. They further tend to focus on violations of the law and on increasing coastal development (in terms of buildings or activities) in a context of low law enforcement.
- The reports by the Governments tend to claim that the Standing Committee Recommendations have been fulfilled or that the process is underway and to focus on the positive actions that have been undertaken for the protection of sea turtles, including monitoring/protection field activities by local teams (Cyprus, Türkiye)
- Although Complainants and Governments claim that threats to sea turtles are still in place or that sea turtle protection is guaranteed, respectively, data on the subject of all these debates (i.e., sea turtles) are rarely reported to support the claimed negative or positive status of the nesting sites.
- When turtles are mentioned, clutch count is the most mentioned indicator. Governments tend to interpret increasing clutch counts as evidence of the good status of the nesting site[8]. Complainants tend to interpret decreasing clutch counts as evidence of a poor status[9] or to interpret increasing clutch counts as evidence of a good status or good protection in previous years, i.e. when the present time nesting females were born on the same beach[10]. The same interpretation is used to claim that the effect of present-time management will be observed only in decades[11].
- When other types of observations are reported (e.g., hatchling disorientation, nesting female entrapment, strandings) they are reported as anecdotal information without clear statistics and analyses in relation to threats[12].The only exception is Türkiye where trends of several indicators (Nesting Success, Hatching Success, Emergence Success, average water entering success) are provided by the Government and in general the hatchling production is mentioned and reported.[13]
- While almost all case files mention the problem with the large-scale construction and the illegal construction, mainly for tourism purposes, as well as the need for improved implementation of existing plans, there is no mention, except in one case (Cyprus) of the need to develop spatial coastal plans or ICZM plans. In no case files there is a mention of the need to regulate marine uses, in particular through development of Marine Spatial Plans.

[8] e.g., Greece, Zakynthos: Files48e_2021_Greece_Laganas _Govt_report.docx
[9] e.g., Greece, Zakynthos: files63e_2020_Follow_up_Rec9_Greece_Laganas bay Zakynthos (Greece)_ARCHELON.docx; Turkey, Mersin Anamur: Files23e_2020_Turkey_Mersin Anamur beach_Complaint_Form.docx
[10] e.g. Greece, Thines Kiparissias: Files62e_2020_Greece_Thines-Kyparissias_NGO-ARCHELON.docx
[11] e.g., Cyprus, Akamas: files32e_2019_Cyprus_Akamas Peninsula_Complainant_Rep.docx
[12] e.g. Greece, Zakynthos: files63e_2020_Follow_up_Rec9_Greece_Laganas bay Zakynthos (Greece)_ARCHELON.docx; Greece, Thines Kiparissias: Files44e_2018_Greece_Marine_Turtles_Thines_Kiparissia_NGO_Rep.docx; files47e_2019_Greece_marine turtles in Thines Kiparissias_Comp_Rep_Archelon.docx; Files62e_2020_Greece_Thines-Kyparissias_NGO-ARCHELON.docx
[13] e.g. Files26e_2019_Follow_up_Rec183_and_182_Turkey_Patara_and_Fethiye_Govt_Rep.docx; Files28e_2021_Turkey_Patara_and_Fethiye_Govt_Rep.docx

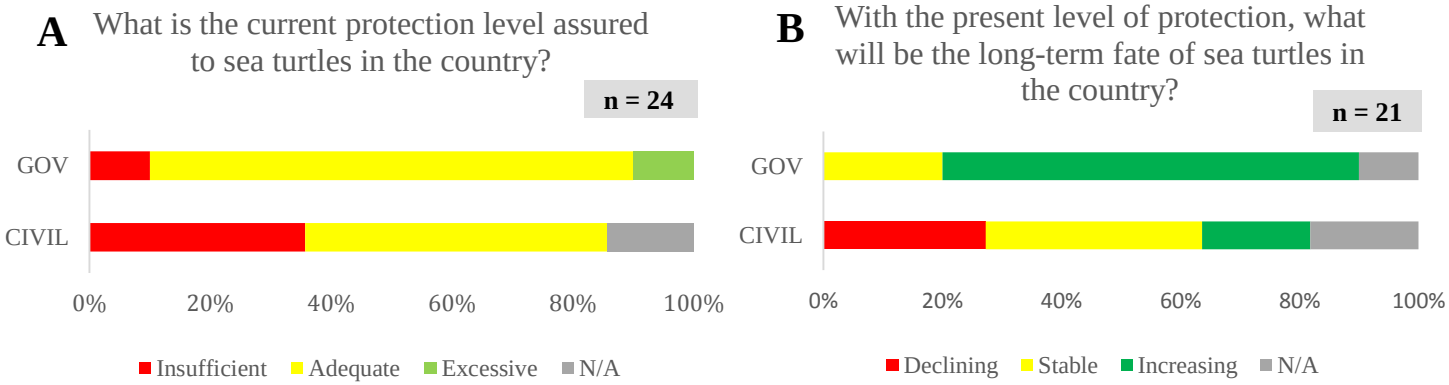
2.3 Main findings of the meetings with stakeholders

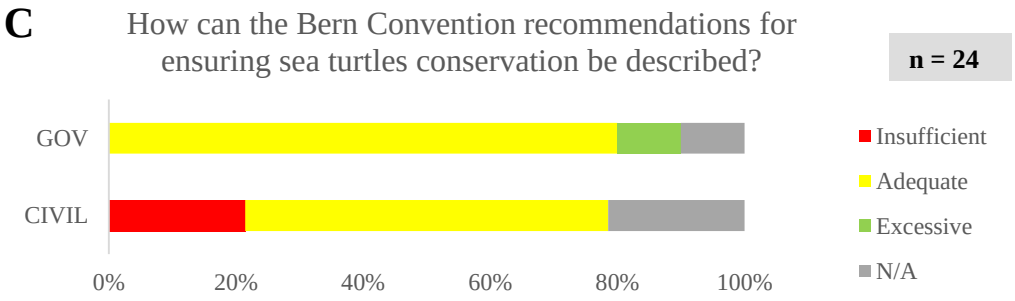
A general pattern emerging from the questionnaires shared ahead of online meetings is a more optimistic opinion of governmental authorities regarding the current level of protection of sea turtles in the country (Fig. 2.3A) and their long term fate (Fig. 2.3B) than civil society organizations. This is somehow expected since the latter group includes the Complainants (the organisations that brought the cases to the attention of the Bern Convention), but it also suggests that different opinions/perceptions may be part of the problem. Regarding the Bern Convention Recommendations, governmental authorities generally consider them adequate (more than civil society) (Fig. 2.3C) and identify engagement of local stakeholders and improving enforcement as key solutions for the open case-files, while civil society organisations do not identify main specific solutions (Fig. 2.3D).

Economic actors were also involved in the consultations concerning sites in Greece and Türkiye, however, the number of replies to the questionnaire received (one for Greece and one for Türkiye) were not considered to be statistically relevant and therefore are not included in the figures below.

A general pattern emerging from the online meetings is that while civil society organizations (including Complainants) tend to claim the existence of a conservation problem by focusing on violations of the law (associated to a lack of enforcement), governmental stakeholders tend to disagree about the existence of a conservation problem by focusing on a biological index (number of clutches) that generally shows non-negative trends. Civil society organisations argue that the number of clutches is the result of past situations and does not reflect current threats.

Based on what is outlined above, two general problems can be identified. First, there is a tendency by all involved stakeholders to consider opinion/perception instead of objective evidence. Second, when evidence is sought, different types of evidence are considered (i.e. legal vs biological indices). This lack of common ground and standardisation may make communication and discussions more difficult and be one of the causes of the current standstill of the case-files.





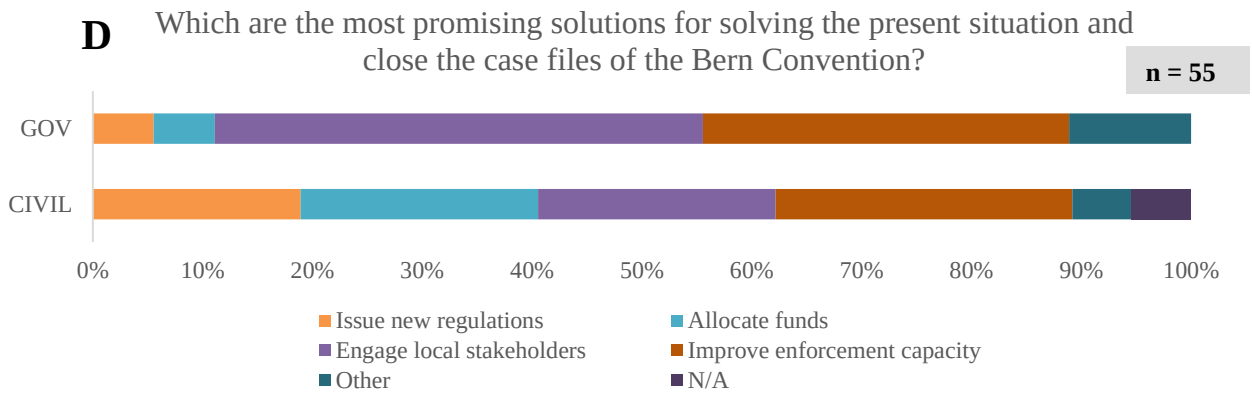


Fig.2.3 A/B/C/D: Question and answers by Government and Civil society representatives in Cyprus, Greece and Türkiye Governmental stakeholders included representatives of relevant Ministries as well as local administrative entities. Civil society stakeholders included representatives of environmental organisations and academia.

3. CONTEXT: MARINE TURTLE CONSERVATION IN THE MEDITERRANEAN

This section aims to provide background information on the current state of play of marine turtle conservation in the Mediterranean, because it determines the setting that the Bern Convention initiative operates in. In the following, the conservation status and conservation priorities for sea turtle populations, current marine turtle conservation efforts on the regional, national and international level, as well as solutions and regulations provided through Integrated Coastal Zone Management and Marine Spatial Planning will be laid out.

3.1 Sea turtle populations: conservation status and priorities

Two sea turtle species have resident populations in the Mediterranean (Wallace et al. 2010): the loggerhead turtle *Caretta caretta* and the green turtle *Chelonia mydas*. The major breeding areas of loggerhead turtles are located in Greece, Türkiye , Cyprus and Libya, and foraging areas occur across the entire Mediterranean, although the most important ones are distributed on the large continental shelves in the eastern Mediterranean (e.g. the Adriatic Sea, the Tunisian/Libyan shelf, the Egyptian shelf, the Aegean Sea) (Casale et al. 2018). The major breeding areas of green turtles are in Türkiye, Cyprus and Syria. At sea, the species distribution is restricted to the easternmost part of the Mediterranean basin, between Türkiye and Egypt, although some individuals can frequent more western waters as far as the south Adriatic and the Tunisian shelf (Casale et al. 2018). Female philopatry determines metapopulation structure of both species in the Mediterranean.

Sea turtle populations are commonly described in terms of number of annual clutches as a proxy of population abundance.

SEA TURTLES PRESENCE IN THE MEDITERREAN

Seven independent Management Units (MUs) of loggerhead turtles have been identified within the region using mitochondrial DNA (mtDNA) markers (Shamblin et al. 2014): (1) Calabria, Italy, (2) western Greece (Zakynthos + Kyparissia + Lakonikos), (3) Rethymno (Crete, Greece), (4) Dalyan + Dalaman (Türkiye), (5) western Türkiye (Fethiye to Çıralı), (6) eastern Mediterranean (central + eastern Türkiye +Lebanon + Israel + Cyprus) and (7) Libya + Tunisia.

A minimum of 3 MUs of green turtles have been identified using mitochondrial short tandem repeats (mtSTRs) (Karaman et al. 2022): (1) Akamas + Akdeniz (Cyprus), (2) Alagadi (Cyprus), and (3) North and South Karpaz (Cyprus) + Israel + Türkiye.

[Drafting note: texbox possibly to be turned in a map]

NUMBER OF CLUTCHES *Average calculated over a 5yeras period*	Loggerhead turtles: **8,179**/ year at 52 major nesting sites Green turtles: **1,650/ year** at 13 major nesting sites (Casale et al. 2018)

Estimating the number of adults is difficult because of the uncertainty of the variables (clutch frequency, remigration interval, sex ratio) used as conversion factors from number of clutches.

NUMBER OF ADULTS *Estimate*	Loggerhead turtles: **15,843** *(95% Confidence Interval: 6,915−31 958)* Green turtles: **3,390** *(95% Confidence Interval: 1,894−6,552)* (Casale and Heppell 2016)

Although clutch counts are a poor indicator of sea turtle abundance (Ceriani et al. 2019; Casale and Ceriani 2020), it is the only one currently available. A rough comparison between two periods (before and after 2000) shows an increase in clutch numbers at the major nesting sites of both species (Casale et al. 2018). This may be interpreted as a sign of recovery from past depletion as a result of decades of protection in the Mediterranean. However, the current knowledge about sea turtle population dynamics as well as past and ongoing impact to the populations by the several anthropogenic threats at land and at sea is insufficient to support such a statement. For the lack of obvious negative trends and for the population range and abundance, the Mediterranean RMU of the loggerhead turtle was considered as Least Concern in the first assessment of this RMU by IUCN (Casale 2015). The first assessment of the Mediterranean RMU of the green turtle is still underway by the Marine Turtle Specialist Group (IUCN/SSC).

The main current threat at foraging grounds in the Mediterranean is represented by interaction with fisheries, while the potential impact of marine debris and pollution on the populations is unclear (Casale et al. 2018). Regarding conservation at nesting sites in the Mediterranean, which is the focus of this document, the main current threats (not in order of importance) are: beach debris, erosion/sand extraction, coastal development, human use, light pollution, and predation (for a review by country see Casale et al. 2018). Continuing the current conservation methods at nesting areas was ranked by a recent review (Casale et al. 2018) as the second conservation priority for Mediterranean sea turtles.

3.2 National, regional and international marine turtle conservation efforts

Mediterranean countries have signed several international conventions protecting sea turtles and then incorporated them into their national legislation (Table 3.2). This process dramatically changed the anthropogenic impact on Mediterranean Sea turtle populations starting from the 1980s, through making their direct (consumptive) use illegal. Historically, severe exploitation of turtles occurred in the first half of the 20th century, with mainly green but also loggerhead turtles being

collected in the waters off eastern Türkiye, Lebanon, Israel and Palestine[14] and sold to markets in the UK and Egypt for local consumption (Hornell 1935; Sella 1982). By now, most Mediterranean countries have legislations that specifically prohibit to kill or capture sea turtles. Several countries hosting nesting sites have also protected some of these sites with specific regulations (see individual country chapters in: Casale et al. 2020).

A Mediterranean regional legal instrument that indirectly protects sea turtles is the Barcelona Convention's Protocol on Integrated Coastal Zone Management. One of its objectives is to "ensure preservation of the integrity of coastal ecosystems", while two of its general principles state that "the biological wealth and the natural dynamics and functioning of the intertidal area and the complementary and interdependent nature of the marine part and the land part forming a single entity shall be taken particularly into account" and that "the ecosystems approach to coastal planning and management shall be applied so as to ensure the sustainable development of coastal zones" (UNEP/MAP-PAP/RAC, 2008).

In addition to the abovementioned role of promoting regulation and protection at national level, international conventions provide useful tools. The Regional Activity Centre for Specially Protected Areas (RAC/SPA) of the Barcelona Convention carried out several initiatives (including training) and produced several guidance tools such as (https://www.rac-spa.org/marine_turtles):

- Action Plan for the Conservation of Marine Turtles in the Mediterranean (1989 and revised 1999)
- Report: Interaction of the marine turtles with fishing in the Mediterranean (1999)
- Sea Turtle handling Guidebook for fishermen (2001)
- Conservation of marine turtles in the Mediterranean region: a gap analysis (2020)
- Guidelines to design legislation and regulations relative to the conservation and management of marine turtle populations and their habitats (2003)
- Guidelines to improve the involvement of rescue centers for marine turtles (2004)
- Marine Turtle Research and Conservation in Libya: A contribution to safeguarding Mediterranean Biodiversity (2021)

Another tool was produced by MedPan (network of Marine Protected Areas -hereby MPAs- managers in the Mediterranean): Marine Turtles in MPAs: a monitoring and management guide (2020).

[14] This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of Council of Europe member States on this issue.

	International Conventions						Habitats Directive (EU)	National Law
	Barcelona Conv.	CBD (1993)	CMS (1979)	CITES (1973)	African Conv. (1969)	Bern Conv. (1979)		
Albania	✓	✓	✓	✓		✓		✓
Algeria	✓	✓	✓	✓	✓			✓
Bosnia and Herzegovina	✓	✓		✓		✓		✓
Croatia	✓	✓	✓	✓		✓	✓	✓
Republic of Cyprus	✓	✓	✓	✓		✓	✓	✓
Egypt	✓	✓	✓	✓	✓			✓
France	✓	✓	✓	✓		✓	✓	✓
Greece	✓	✓	✓	✓		✓	✓	✓
Israel	✓	✓	✓	✓				✓
Italy	✓	✓	✓	✓		✓	✓	✓
Lebanon	✓	✓		✓				✓
Libya	✓	✓	✓	✓	✓			✓
Malta	✓	✓	✓	✓		✓	✓	✓
Monaco	✓	✓	✓	✓		✓		✓
Montenegro	✓	✓	✓	✓		✓		✓
Morocco	✓	✓	✓	✓	✓	✓		✓
Slovenia	✓	✓	✓	✓		✓	✓	✓
Spain	✓	✓	✓	✓		✓	✓	✓
Syria	✓	✓	✓	✓				
Tunisia	✓	✓	✓	✓	✓	✓		✓
Türkiye	✓	✓		✓		✓		✓

Table 3.2. International conventions and national laws protecting sea turtles in the Mediterranean (modified after Casale et al. 2018). African Conv.: African Convention on the Conservation of Nature and Natural Resources; CBD: Convention on Biological Diversity; CMS: Convention on the Conservation of Migratory Species of Wild Animals; CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.

3.3 The role of Integrated Coastal Zone Management and Marine Spatial Planning: solutions and regulations for marine turtle conservation

Increased human use of marine and coastal space has intensified pressures on valuable coastal and marine ecosystems that require special approaches to protection and conservation. The sea turtles can be considered as extremely important elements of some Mediterranean ecosystems. Coastal and sea uses are often characterised by conflicting interactions of environmental, spatial, organisational, or aesthetic nature. A better understanding and recognition of the linkages between marine and coastal ecosystems and their elements, such as sea turtles, and the wider coastal and marine area gave impetus to the need for effective incentives and institutional arrangements to manage these ecosystems in the broader context of integrated coastal and marine management frameworks.

Another important aspect to be considered with regard to marine turtle conservation is their economic value, in particular comparison between harvesting marine turtles and conserving the species. In this perspective, the issue of valuation of ecosystem services, i.e. estimating the value of

a service a certain ecosystem, in this case the marine turtle, brings to humanity, and not only in terms of their use for food but also other services they provide to human welfare, is essential. This is a relatively new scientific field, which is progressing rapidly and, today, effective methods exist to value ecosystem services as an indispensable input to decision-making. One important recent example is the calculation of economic value of marine turtles in the Asia-Pacific (Brander et al, 2021). The report concludes that turtle extinction could result in up to US $39 billion per year in economic welfare losses. On the other hand, taking action to protect sea turtles would deliver improvements in human welfare valued at US $54 billion per year. Similar studies have not been prepared in the Mediterranean but the one above points to possible action in the future.

To ensure a sustainable use of these resources, an ecosystem-based approach to guide Integrated Coastal Zone Management (ICZM**)** and Marine Spatial Planning (MSP**)** was developed. ICZM and MSP are key tools in articulating policies that balance conflicting sector-based interests competing over the use of sea-space, a competition that is likely to intensify in the future. In general, the goals of ICZM are broader than those of biodiversity conservation, with a strong emphasis on the governance process and the well-being of people. The main goals of ICZM can be generalized as to: (1) improve the governance process that is supported by and benefits communities and nations; (2) improve the economy, health and social well-being of people who depend upon coastal resources; and, (3) improve environmental quality to maintain biodiversity and ecosystem productivity. In contrast, the main goals of biodiversity conservation are often stated as to: (1) conserve biological diversity, and (2) conserve ecosystem functioning (Best, 2003). The integrated view on the ICZM and biodiversity conservation, which by default also includes the conservation and protection of marine turtles, are best represented in the Table 3.3 below.

TABLE 1: INTEGRATING THE STRENGTHS OF ICM AND BIODIVERSITY CONSERVATION

Theme	ICM	Biodiversity Conservation
Focus	Emphasis on development: promote the people, preserve the place	Emphasis on conservation: preserve the place, engage the people
Goals	Improve the governance process, economy, health, social well-being, and environmental quality to maintain ecosystem productivity	Conserve biological diversity and ecosystem function
Public role	Neutral brokers	Environmental advocates
Site selection and project design	Development and issue-based approach (i.e., decentralization, strengthen local communities)	Global biodiversity assessments and threats-based approach
Site-based approaches and strengths	Emphasis on governance process helps establish legal, decision-making and enabling environments across local, sub-national and national scales; establishing strong national ICM policies, frameworks and institutions that support local efforts and reduce external threats to MPAs	Emphasis on establishing and strengthening management schemes in MPAs; land acquisition, concessions and debt-for-nature swaps; target critical marine biodiversity and ecosystems in need of immediate protection; garner international funds and resources
International approaches and strengths	Promote international awareness of the need for integrated approaches to coastal management and capacity building; mainstream ICM into development plans	Change global trade policies and transform businesses; reduce threats from global economic drivers, such as unsustainable fishing and tourism; strengthen international conventions
Scaling-up approaches and trends	Coastal watershed and basin-scale management; establish strong national ICM policies, frameworks and institutions; use local government units to replicate efforts; establish authorities to integrate across land and marine resources	Establish functionally-connected networks of MPAs; Eco-regional and seascape approaches to biodiversity threats

Table 3.3. Integration of ICZM and biodiversity conservation

ICZM enables a more balanced and yet comprehensive approach to ensuring sustainable economic development and environmental protection, including conservation, so that the final program can be mainstreamed into the local development agenda. Conservation and other environmental as well as socioeconomic issues are evaluated based on assessments of their risks to human and ecosystem health; these are then prioritized for management interventions. This is particularly important as nature conservation is conventionally low on the government priority agenda.

In the Mediterranean, these considerations were best expressed in the Barcelona Convention's Protocol on Integrated Coastal Zone Management. The Protocol defines the coastal zone as "the geomorphologic area [on] either side of the seashore in which the interaction between the marine and land parts occurs in the form of complex ecological and resource systems made up of biotic and abiotic components coexisting and interacting with human communities and relevant socio-economic activities." (UNEP/MAP-PAP/RAC, 2008) Consequently, it defines the ICZM as a "dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts." (UNEP/MAP-PAP/RAC, 2008).

Among the first examples of implementation of the Marine Spatial Planning (MSP) for the management of marine protected areas are Australia's Great Barrier Reef Marine Park (GBRMPA) and the Florida Keys National Marine Sanctuary in the early seventies of the last century. The standard definition of the MSP states that it is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process. The same principles of an ecosystem-based approach as in ICZM also apply to MSP.

With regard to the protection and conservation of marine turtles it is important to note that the boundaries of their ecosystem extend way beyond their nesting beaches. As many cases show, their ecosystem includes their routes, which are under equally great pressure from fisheries and transportation as the nesting sites. Therefore, it is essential to consider their ecosystem in a much wider context than the most endangered areas. MSP, when backed by appropriate legislation and governance structure, may be the answer for a more efficient conservation and protection of the Mediterranean marine turtle ecosystem.

4. CONSERVATION OF SEA TURTLE NESTING SITES

Nesting sites have a very specific role in sea turtle biology and hence in sea turtle conservation: they are the only habitat where new individuals can develop. Moreover, the beach environment (incubation temperature) determines the sex of the newborns (Oz et al. 2004). In other words, the role of nesting sites is to contribute to the spawning of individuals of both sexes from which the population at sea reproducing at that pool of nesting sites is recruited. Therefore, this section of the document is dedicated to provide an understanding on the anthropogenic threats for nesting sites and introducing how the conservation status of a nesting site can be assessed. Because of its importance in turtle conservation, a special section highlights the role of local community involvement. Finally, experiences and best practice examples from marine turtle conservation in other places of the world aim to broaden the view and provide inspiration to learn from.

It remains to be stated that while the presence of potential threats is generally not considered a positive factor, whether and how much sea turtles are impacted by those potential threats cannot be known without assessing the biological output of a nesting site in terms of production of new individuals of both sexes.

4.1. Anthropogenic threats at nesting sites

This section introduces the different categories of potential threats to sea turtles. Whether or not a threat category impacts sea turtle in a real case needs to be assessed through a proper investigation.

4.1.1. Beach reduction by hard constructions

Beaches are dynamic habitats, usually in an equilibrium between sand accumulation and -removal that keeps the coastline almost stable in the short term. However, this equilibrium may change due to natural or anthropogenic causes. Beach erosion can make a sandy beach disappear and therefore be unavailable for turtle nesting. However, even before that, beach reduction can affect nest distribution (Fujisaki et al. 2018) and can reduce reproductive success because of nest density-dependent processes (Mazaris et al. 2009). Moreover, a reduced width increases the chances that egg clutches are laid close to the high-tide line and suffer from inundation (Tuttle and Rostal 2010; Limpus et al. 2020). In such situations, human constructions (e.g., buildings, roads, seawalls) at the rear side of the beach may worsen the situation. For instance, seawalls can have profound effects on the beach dynamics, profile and width (Dugan and Hubbard 2006), and can have a negative effect on sea turtle nesting success. Seawalls can also increase the probability of nests to be washed over during storms (Rizkalla and Savage 2011), with a potential effect on in-nest mortality and sex ratio (Foley et al. 2000; Oz et al. 2004; Foley et al. 2006). Moreover, constructions impede the beach to shift when the coastline moves, causing the complete obliteration of the sand area and the sea turtle nesting habitat. This is particularly important when taking into account sea level rise caused by climate change and for this reason hard constructions should be avoided (Fish et al. 2008).

4.1.2. Alteration of sand composition

Sand features may affect nest site selection (Karavas et al. 2005). Moreover, the several features of sand type affect the incubation environment variables in the egg chamber, including gas exchange rate, humidity and temperature (McGehee 1990; Ackerman 1997; Speakman et al. 1998). Therefore, any alteration of sand features can alter these incubation variables and extreme alteration represented

by mixing sand with anthropogenic material, soil, or mud, may affect the incubation success or the emergence of hatchling to the beach surface. For instance, less nesting was observed at beach zones with finer material (Karavas et al. 2005) which may indicate a female selection against fine material that impedes adequate gas diffusion for incubation needs. Moreover, compact sand (possibly caused by altered sand composition, pedestrian trampling or vehicles) can decrease emergence success of hatchlings (Peters et al. 1994).

4.1.3. Alteration of beach profile

The beach profile is among the features affecting nesting success and the number of clutches occurring in a coastal tract (Mazaris et al. 2006; Siqueira-Silva et al. 2020). Moreover, beach profile, vegetation and the dune profile affect the point on the beach (in the sea-land axis) that a sea turtle female selects to lay her eggs (Miller 2003; Karavas et al. 2005; Serafini et al. 2009; Kelly et al. 2017; Halls and Randall 2018) and in turn the clutch position on the beach may affect incubation conditions and ultimately hatching success and sex ratio (Martins et al. 2022). Therefore, altering the profile may affect the distribution and success of turtle clutches.

4.1.4. Disturbance by light pollution

Disturbance by light pollution is one of the most important and widespread anthropogenic threats at nesting sites (Witherington and Martin 2000). Artificial lights can discourage females to come ashore to nest, causing a different distribution of clutches along a coastline (Witherington 1992; Kaska et al. 2010; Price et al. 2018). They also disturb the nesting phase and can increase the activity of hatchling predators (Silva et al. 2017). Furthermore, hatchlings find the sea by means of visual cues (brightness and low horizon) (Limpus and Kamrowski 2013) and are attracted by artificial lights (Tuxbury and Salmon 2005; Berry et al. 2013). This causes mis- and disorientation that make hatchlings spend more time on the beach and be subject to predation, get entrapped in vegetation and circle around without finding the sea (Witherington and Martin 2000; Salmon 2006; Lorne and Salmon 2007; Erb and Wyneken 2019). Such anthropogenic mortality may have an effect at population level (Dimitriadis et al. 2018).

4.1.5. Obstacles on the beach

Obstacles on the beach induce turtles to nest closer to sea (Witherington et al. 2011) and the presence of obstacles has a negative effect on nesting success (Fujisaki and Lamont 2016). Beach furniture like sun chairs and umbrellas used during the day may at night have negative effects on sea turtle nesting activity (Margaritoulis 2005; González et al. 2020) although obstacle density is a key factor and the problem may be lower in large beaches with low obstacle density (Ware and Fuentes 2020). Large obstacles can also entrap females, impeding them to return to the sea (Pikesley et al. 2013).

4.1.6. Disturbance of females while nesting

Human presence on the beach can disturb the female while it is on the beach searching for a place where to lay eggs, digging the body pit or the egg chamber, causing abortion of the nesting attempt and resulting in a reduced nesting success (number of clutches / total emergences) at beach level (Margaritoulis 2005; Kaska et al. 2010). However, this does not necessarily imply a reduction of the overall number of clutches, because the female can just return to the sea and try to nest at another time at the same or another place in the same nesting site.

4.1.7. Damage or disturbance of eggs

Human presence during daylight and associated furniture (umbrellas, beach towels, trampling) can compact the sand. Furthermore, furniture like umbrellas and beach towels as well as any other structure can create shadow that may alter the temperature of the sand and consequently the incubation duration and sex ratio.

4.1.8. Predation by anthropophilic predators

Although predation is a natural source of mortality, in certain cases predation level may be much higher than natural predation because the populations of certain anthropophilic species (e.g., canids, seagulls, rats) may be larger than natural due to the trophic resources provided by human presence. In such cases, predation may be considered as an anthropogenic threat. Predation of eggs and hatchlings while in the nest decreases the overall proportion of eggs laid/live hatchlings emerging from a nest, while predation on hatchlings crawling on the beach towards the sea decreases the overall proportion of eggs laid/live hatchlings entering the sea. Predation may also alter sex ratio if predated clutches are distributed in subareas with different sand temperature (Oz et al. 2004) or if a clutch is partially predated and the remaining eggs experience a different temperature than the average temperature of the non-predated clutches (Kaska 2000).

4.2. Assessing the conservation status of a sea turtle nesting site

While some anthropogenic threats may be rather obvious, their impact on sea turtles is less obvious and its level is usually hypothesized on the basis of the threats. However, a direct measure of the impact of the anthropogenic threats would greatly improve the conservation capacity, in terms of prompt detection of increasing threats and of the effectiveness of conservation measures.

4.2.1 Biological variables describing the output of a sea turtle nesting site

The population value of a sea turtle nesting site can be described (and measured) in terms of only two key biological variables (KBV): (i) number of new individuals entering the sea and (ii) their sex ratio. Factors at sea (independent from the beach; e.g. mortality and trophic resources at sea, adult sex ratio) determine the number of females that – in natural conditions – would approach a nesting beach and the number of fertile eggs they would lay. Then, anthropogenic factors at a nesting site can alter potential KBV by (i) discouraging females to lay their eggs at that site and making them move to other sites, (ii) reducing the proportion of fertile eggs that result in a hatchling entering the sea, and/or (iii) altering the hatchling sex ratio. Therefore, definition and monitoring of the conservation status of a nesting site should focus only on the factors acting directly at the nesting sites and variables observed there.

Of the two KBV, sex ratio (SR) is a fundamental variable (cannot be broken down), while the number of individuals entering the sea (N) is determined by 6 variables:

$$N = C*CS*F*IS*SS*WS$$

where C is the number of clutches laid at the nesting site, CS is the average clutch size (number of eggs per clutch), F is the average fertility (proportion of fertile eggs on the total CS), IS is the average incubation success (proportion of fertile eggs that hatch), SS is the average surfacing survival (proportion of hatchlings that emerge at beach surface), and WS is the average water entering success (proportion of emerged hatchlings that enter the sea).

C is primarily affected by factors at sea, although it may also be affected by factors acting at the nesting site that induce the female to lay all or part of her clutches elsewhere. If the marine area in front of a nesting site is included in the definition of the nesting site, then C may also be affected by mortality of the adults caused by fishing gears near the nesting beach. CS and F are entirely due to factors at sea. IS, SS, WS and SR are entirely due to factors acting at the nesting site (on land). Therefore, 5 primary biological variables (C, IS, SS, WS and SR) should be considered for assessing the conservation status of the nesting site.

Two variables commonly measured in sea turtle nesting studies are hatching success (HS; proportion of hatched eggs to total eggs laid) and emergence success (ES; proportion of hatchlings that emerge on the beach surface to the total eggs laid) and have been used to calculate the production of hatchlings in terms of emergences from the nest, not considering WS because the latter it is difficult to estimate (Brost et al. 2015). They are related to the variables mentioned above as follows: HS=F*IS; ES=F*IS*SS.

4.2.2 Primary biological variables suitable as indicators of anthropogenic threats at nesting sites

The relationship between the eight types of anthropogenic threats (see section 4.1) and the five primary biological variables (see section 4.2.1) is summarized by Table 4.2.2. However, only four primary biological variables can be used as indicators of those anthropogenic threats and consequently of the conservation status of the nesting sites, because one of them (C, number of clutches laid) is not suitable, because is primarily affected by factors at sea or to the population productivity occurred decades ago (i.e., a period equal to the age of sexual maturity). Moreover, the listed anthropogenic threats at nesting sites do not necessarily cause a decrease of the number of clutches (C) at site level, because in cases of reduction of the suitable area, clutch density can greatly increase before density-dependent effects occur. In cases of disturbance, the female can just try laying her eggs again in the same spot or in another part of the same site, eventually laying the same number of clutches at the nesting site. However, it cannot be excluded that with a high level of such disturbance females will move (temporarily or permanently) to a different site, determining a decrease of C at the original nesting site. In conclusion, anthropogenic threats at nesting sites can have limited (if any) effects on C and consequently C does not represent a suitable indicator of the conservation status, although nesting success may provide insights on initial problems (see section 4.1).

	Primary biological variables				
Anthropogenic impacts	**C***	**IS**	**SS**	**WS**	**SR**
Beach reduction by hard constructions	✓	✓	✓		✓
Alteration of sand composition		✓	✓		✓
Alteration of beach profile	✓	✓			✓
Disturbance by light pollution	✓			✓	
Obstacles on the beach	✓	✓	✓		✓
Disturbance of females while nesting	✓				
Damage or disturbance of eggs		✓	✓		✓
Predation by anthropophilic predators		✓	✓	✓	✓

* mainly affected by other factors (see text)

Table 4.2.2. The 5(4) primary biological variables affected by 8 anthropogenic impacts at sea turtle nesting sites.

4.2.3 The importance of monitoring spatiotemporal differences

Given the high variability of sea turtle biological variables at nesting sites, single values of the variables are not informative in terms of the conservation status of a nesting site. Comparing variable values across different parts of the nesting site and across years may be more informative, especially if compared with the spatiotemporal occurrence of potential anthropogenic threats. For instance, a change of one variable value after a certain threat (theoretically affecting that variable) appeared or was removed would represent a strong indication of the impact of that threat and of the conservation measures aimed to mitigate the threat.

Regarding temporal trends, while a positive trend of the number of individuals recruiting at sea and with a constant/natural sex ratio indicates a *Good* conservation status of the nesting beach (i.e. the beach habitat is appropriate for the species needs and allows a natural productivity of hatchlings and hatchling sex ratio), other trends do not necessarily imply a *Not-Good* status (i.e. the beach habitat is not adequate for the species needs and reduces the potential productivity or alters the natural hatchling sex ratio). A negative or stable trend of the number of individuals recruiting at sea or a trend of hatchling sex ratio might indicate a *Not-Good* conservation status only if they are caused by anthropogenic factors at the nesting beach and not if they are caused by other factors at sea. Therefore, it is fundamental to (i) monitor the anthropogenic threats and (ii) the variables affected by them.

4.2.4 Conservation-dependency

In a nesting beach that would qualify for a status classified as Good, the number of individuals recruiting at sea and their sex ratio may depend on intensive conservation activities. In other words, anthropogenic factors are impactful but can be counterbalanced by conservation measures. Such a conservation-dependency however represents a weakness (conservation activities may cease) and should be considered when assigning a conservation status.

4.2.5 Vulnerability to climate change

In a nesting beach that would qualify for a *Good* status, anthropogenic factors resulting in a negative impact (on the number of individuals recruiting at sea or on their sex ratio) occur only in the future in the context of climate change. Still, such a situation represents a weakness (for the future of the nesting site) and should be considered when assigning a conservation status.

4.3 Local community involvement

Local communities have the strongest interaction with the nesting beach habitat and may have strong interest in coastal development. They may include representatives of all main stakeholders (business sector, civil society, governmental agencies). Therefore, the engagement of local communities in sea turtle conservation may be key for any long-term conservation strategy and should be pursued. There are two main and not mutually exclusive factors that can induce local communities to engage in sea turtle conservation: ethical/emotional affection and economic interest. The first is generally reached through public awareness, while the second is reached through direct or indirect use of sea turtles.

Public awareness may be conducted by personal meetings or public events. Release events of turtles incidentally captured or found stranded are generally an excellent way to promote public awareness. Such activities are facilitated by rescue centers and networks. Moreover, rescue centers, being permanent structures with constant activity, may become a reference point for local communities and represent an additional opportunity for local communities and tourists to see sea

turtles while in rehabilitation. Although sea turtle rescue centers are primarily set up for rehabilitating individuals and may also provide scientific information (UNEP 2004; Ullmann and Stachowitsch 2015), they may also play an important role in promoting conservation at nesting sites if located near these areas (Kaska et al. 2011).

It is well known – with several cases worldwide - that non-consumptive use of sea turtles can generate revenue and even a greater revenue than consumptive use (Troeng and Drews 2004) and have been the main driver for the success of some conservation programs (Pegas et al. 2013). Non-consumptive use includes ecotourism activities such as turtle-watching at land (nesting females) or at sea. Specific studies showed that turtle-watching does not cause behavioral changes at land (Marco et al. 2021; Smith et al. 2021) or at sea (Papafitsoros et al. 2021), although at sea a potential threat is represented by maritime traffic and increased risk of collision with propellers (Papafitsoros et al. 2021).

4.4 Experiences of conserving nesting sites from other regions

In this section, examples are displayed that show how sea turtle conservation at nesting sites was tackled in other countries. Two examples cover very important nesting areas for turtles in USA (Florida) and Brazil. Here, it needs to be taken into account that the socio-economic context greatly differs between these countries as well as from that of the countries of the case-files. Additionally, examples of Integrated Coastal Zone Management are provided from Odisha (India) and Sukabumi (Indonesia).

4.4.1. USA (Florida): involvement of local communities

Until recently, Florida hosted the largest nesting population of the loggerhead sea turtle worldwide, with over 97,000 annual clutches distributed along most of the coast, although with different density (Ceriani et al. 2019). Florida is also an important tourist destination and has a highly developed coast. For these reasons, it represents a good opportunity to learn lessons about potential conflicts between coastal development and protection of nesting sites.

At federal level**,** marine turtles are protected under the Federal Endangered Species Act of 1973 and, nationally, by Florida's Marine Turtle Protection Act (Florida Statutes), that restricts the take, possession, disturbance, mutilation, destruction, sale, transference, molestation, and harassment of marine turtles, nests or eggs. However, the relevant regulations are at county level. Sea turtles are mainly protected through the dedicated sea turtle program of the Florida Fish and Wildlife Conservation Commission (FWC). FWC protects turtles through three divisions: Division of Habitat and Species Conservation - Imperiled Species Management (ISM), Fish and Wildlife Research Institute (FWRI), Division of Law Enforcement (DLE). ISM is primarily responsible for the management efforts of sea turtle recovery. This includes reviewing permits for coastal construction and other beach activities, commenting on land acquisition and management of nesting habitat, evaluating the success of protection measures in the field, and administration of permits for sea turtle research and rehabilitation.

Regarding coastal development, in the past some coastal tracts have been protected, also thanks to private donations, and therefore remained pristine. However, there are no turtle-related restrictions to coastal constructions along the rest of the coast. The Florida Department of Environmental Protection and the FWC-ISM dually review permits for coastal construction under the Beaches and Coastal Systems Rule that affect marine turtles. In this respect, the main concern is minimizing light pollution and the state of Florida developed the Model Lighting Ordinance for Marine Turtle Protection Rule to guide local governments in creating lighting ordinances.

Regarding the use of the nesting habitat, the main concern is beach furniture that represents obstacles for sea turtle nesting. Beach users are invited to remove furniture from the beach at night

or, if they cannot be removed, to stack and arrange them to minimize their impact. Except in parks, night access is not prohibited and people are informed through panels at beach entrances about the correct behaviour to minimize disturbance to turtles. Finally, scientific, conservation, or educational activities that directly involve marine turtles require a specific authorization from FWC. Due to the extensive length of the coast, implementation and enforcement are possible thanks to the good will of local people who are targeted by information campaigns by FWC and NGOs.

4.4.2. Brazil: shifting local community habits

Brazil hosts breeding sites for five sea turtles species (*Chelonia mydas, Caretta caretta, Eretmochelys imbricata, Lepidochelys olivacea* and *Dermochelys coriacea*). When the conservation interest for these animals began, sea turtles were used for subsistence, commercialization, and cultural traditional practices and sea turtle populations were severely depleted (Marcovaldi and dei Marcovaldi 1999). After prohibition of sea turtle and egg harvesting (1986) and long-term conservation activities by project TAMAR, all turtle populations are now recovering (e.g., Marcovaldi and Chaloupka 2007). Therefore, Brazil represents a good opportunity to learn lessons about the most extreme conflict between humans and sea turtles, represented by direct consumption, as well as conflicts due to coastal development.

The conservation success of TAMAR is mainly attributed to its capacity to engage local communities (da Silva et al. 2015). Specifically, TAMAR created economic opportunities (e.g. T-shirt manufacturing groups) for members of local fisher communities that have had a cultural tradition of turtle and egg harvesting, especially in non-tourist destinations. These income-generation activities for coastal communities improved their quality of life, maintaining, but inverting their direct tie to sea turtles and while the creation of Biological Reserves restricted the use of natural resource by the same communities s (da Silva et al. 2015). Regarding coastal development (in coastal tracts not protected as national parks and the like) TAMAR conducted awareness campaigns to promote measures to minimize light pollution (perceived as the main threat for sea turtles in the area), providing a symbolic certificate to the owners that screened their lights. The success of such an initiative allowed TAMAR to stop relocating clutches and to leave them in situ because hatchlings were no more disoriented (da Silva et al. 2015). These campaigns also induced associations of condo complexes to act autonomously against the use of vehicles on the beaches.

4.4.3 India (Odisha): Integrated Coastal Zone Management Planning

Odisha, located in the northern part of the east coast of India, is a maritime state with immense wealth of natural resources. Odisha's coastline occupies a length of around 480 km. Odisha is known for its rich marine and coastal biodiversity including Olive Ridley Sea Turtles, Irrawaddy Dolphins, diverse mangroves and rich fish stocks. It also houses some of the most ecologically sensitive and fragile areas including the turtle nesting ground of Gahirmatha and a marine sanctuary. The Integrated Coastal Zone Management Plan (ICZMP) Odisha is a planning framework that aims at improving the management of coastal and marine resources, while addressing the concerns of those people that live, work or visit the coastal zone. Identifying and analysing the threats to marine environment and biodiversity was an essential step in preparation of the ICZMP, as these are integral to the Odisha coast.

Four species of sea turtles–Olive Ridley, Green, Hawksbill and Leatherback–have been reported in Odisha, though the nesting of only the Olive Ridley has been confirmed. There are three recorded mass-nesting beaches in Odisha; Gahirmatha, Rushikulya and Devi river mouth, although mass nesting has not occurred at Devi mouth in the last decade. The reduction in mass nesting is mostly associated with the reduced size of the beach availability at Gahirmatha, due to cyclonic

storms and beach erosion. The nesting at the rookery near Devi river mouth has been altered by Casuarina plantation and the nesting population has shown a considerable reduction in number. Since the discovery of the Rushikulya rookery in 1994, Olive Ridleys are nesting in large numbers, but with fluctuation from year to year. India, being a signatory nation to many conventions including the Convention on Migratory Species (CMS), has the responsibility of protecting Olive Ridley turtle and its nesting beaches, breeding, feeding and congregation areas, as well as its migratory pathways in the sea.

Due to the sensitive nature of the Odisha Coast, it is especially vulnerable to the external pressures which occur due to anthropogenic activities. There have been various cases in the coastal zone where development has come up at the expense of the existing sensitive habitats. Such development puts additional pressure on the fragile coastal system which can result in the degradation of the existing environmental services.

The ICZMP Odisha proposed several measures to protect marine turtles in the wider development and geographical context. It included, among others, investments, in the conservation and protection of the Olive Ridley Turtle and other aquatic wildlife. Sensitive habitats have been protected as per the existing legal provisions to ensure that they were devoid of the negative impacts due to human activities. The Plan proposed that efficient patrolling mechanisms be put in place for monitoring and regulating marine fishing (in regulated fishing and trawling zones) for achieving a higher degree of conservation of marine resources and Olive Ridley Turtles. There are several points where the turtle migration paths coincide with the marine shipping routes. Thus, it was found that the movement of container ships should be monitored, with an implementation of proper surveillance strategy and an on-board vessel monitoring system to be put in place during turtle nesting period. The protection measures were extended to the marine area through appropriate Marine Spatial Planning measures. The plan provided detailed recommendations for marine turtles management.

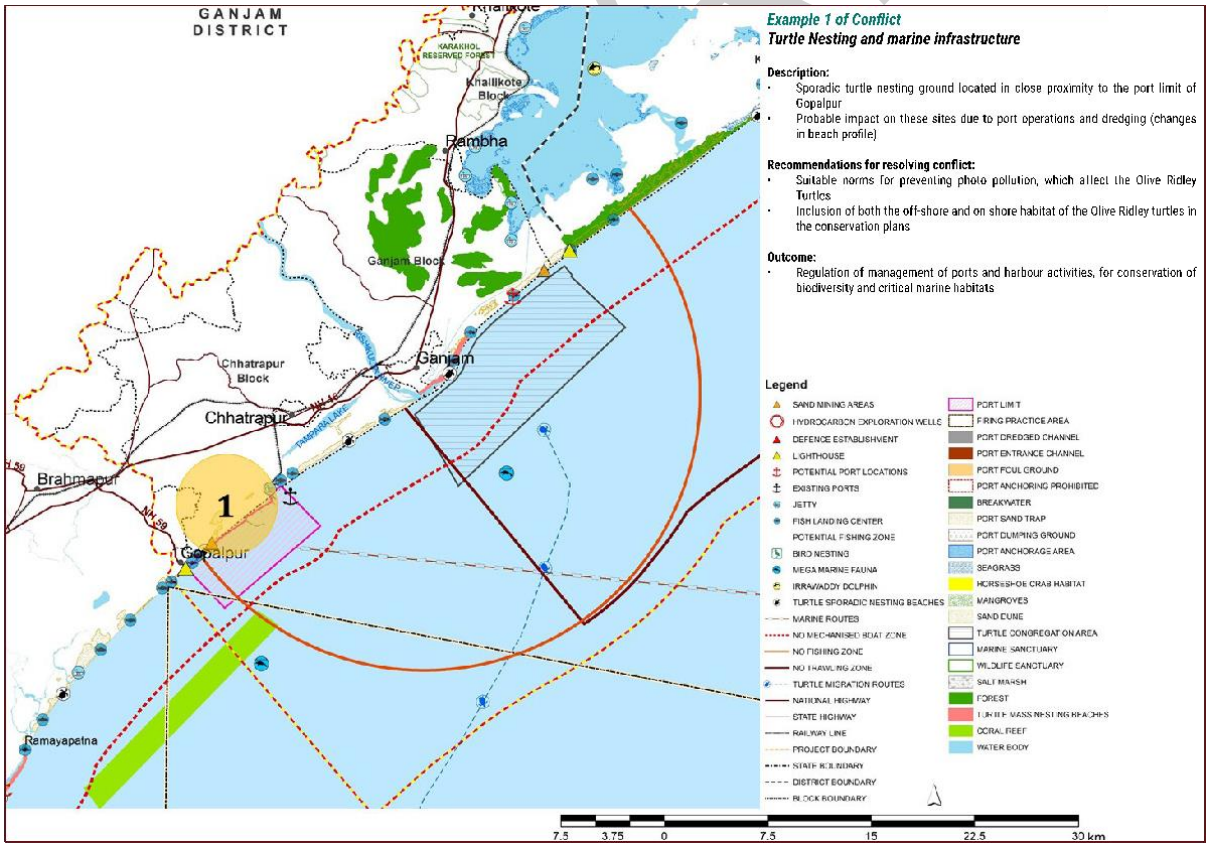


Figure 4.4.3. Turtle nesting and marine infrastructure in one of Odisha conflict areas

Environmental Protection (Ecosystem and biodiversity)			
EP01: Provide management guidelines for important marine areas	• Turtle congregations observed in the Gahirmatha coastal waters (between the Dhamra and Mahanadi river mouths), in the Devi coastal waters (between Jatadhar muhana and Kadua muhana) and in the Rushikulya coastal waters (the Chilka mouth or the Magarmukh to Rushikulya river mouth) • There exist conflicts between biodiversity rich areas and human activities in the marine areas	EP01-01: Inclusion of both the off-shore and on shore habitat of the Olive Ridley turtles in the conservation plans EP01-02: Turtle congregation zones to have in place a congregation monitoring mechanism (on an annual basis) EP01-03: Legal backup for Rushikulya 'no-fishing' zone (on a seasonal basis) EP01-04: Suitable norms for preventing photo pollution, which affect the Olive Ridley Turtles. The turtle-friendly illumination at Dhamra Port is a good example for such intervention	Suitable solutions to prevent inter and intra conflicts between human activities and biodiversity rich areas

Marine Spatial Planning			
ILM01: Implementation of surveillance strategies for protection of marine biodiversity	Marine protected areas (Gahirmatha) and fishing - seasonal conflict during turtle nesting periods	ILM01-01: Stricter monitoring of fishing regulations (mainly trawling and other such large scale activities) for conservation of biodiversity	Higher degree for conservation of turtles would be achieved through efficient patrolling mechanisms to monitor marine fishing
		ILM01-02: Stringent enforcement of usage of TEDs in fishing crafts	
	National level body is required for management of area falling within 12 nautical miles from LTL,which currently has little governance.	ILM01-03: Creation of a national level nodal agency for marine area administration and management	Agency responsible for preparation of full-fledged marine spatial plans and to serve as conflict resolution body for disputes related to the marine areas.

Table 4.4.3 Two examples of management measures in ICZMP Odisha

4.4.4 Indonesia (Sukabumi): Protecting the Green Turtle through Integrated Coastal Management

Sukabumi is the only place along the southern coastline of West Java where sea turtles nest. Dominant in all nine nesting locations including Pangumbahan beach is the green turtle *(Chelonia mydas)*. Recognized as the official symbol of Sukabumi Regency, the species' existence has been threatened by human activities including rampant turtle egg collection and unregulated invasion and utilization of its habitat by coastal tourism development and sand mining. Previous private sector management of the beach under local government license allowed a proportion of collected eggs to be sold while the rest were hatched for release. However, scientific assessments indicated a large decline in turtle population.

The local government regained management in 2008, developing and implementing a turtle conservation program as part of Sukabumi's Integrated Coastal Zone Management (ICZM) program. The national government, through the Ministry of Marine Affairs and Fisheries (MOMAF), declared Pangumbahan Beach as a conservation area and provided support for the establishment of a turtle conservation center.

The program ensured that all turtle eggs were allowed to hatch and the hatchlings released. An increase in the nesting population and number of eggs and hatchlings released relative to the private concession period was evident. Regulated ecotourism was permitted in the conservation area to promote education and awareness of turtle conservation and provide economic opportunities for local people. Within the regulated ecotourism, visitors are only allowed to do selected activities such as viewing of turtle egg-laying, visiting the turtle hatchery, and releasing young turtles into the sea. Visitors are also allowed to visit nearby beach to see its scenery and do surfing and fishing. The case study demonstrates the concerted efforts of the local and national governments and various stakeholders to put in place necessary governance mechanisms and actions using ICZM approaches, to ensure that the green turtle, the natural heritage and symbol of Sukabumi Regency, remains protected. The ICZM concept and framework, and the process of putting in place the necessary governance elements, can enable collaboration and convergence of efforts and resources across different agencies and sectors and facilitate stakeholder participation. This has been demonstrated in

the development and implementation of the sea turtle conservation program in Sukabumi Regency. One key challenge faced in the development of the sea turtle conservation area was the low awareness of communities in the area on marine and coastal conservation and the impact of their practice of taking turtle eggs for consumption or sale.

Figure 4.4.4 Master Plan of the area

5. RESEARCH UNDERTAKEN: FILTERING OUT WHICH FACTORS AFFECT THE CONSERVATION STATUS OF SEA TURTLE NESTING SITES

One of the activities undertaken under the Bern Convention Initiative was to investigate threats and conservation measures that are commonly believed to endanger/improve the conservation status of a nesting site and verify which out of these are truly determining factors. This was because within the case-files, a lot of disturbance for marine turtles is reported from the side of the complainants, yet the actual impact on their conservation status remains unclear. To make sure that the decision-making by the Standing Committee and elaboration of the guidance tool are based on scientific evidence, a research activity has been developed and implemented by a team of nine experts:

Paolo Casale, Thomas Arapis, Erdal Elginoz, Wayne Fuller, Yakup Kaska, Dimitris Margaritoulis, Ayse Oruç, Doğan Sözbilen, Panagiota Theodorou.

The result of this activity is described in this section.

5.1. Goal and Methods

The methodological approach consisted of (i) building a matrix of response variables (conservation status) and explanatory variables (conservation measures) and (ii) populating them with scores (values of each variable) to investigate actual causal connections. For this purpose, 22 nesting sites in the island of Cyprus, Greece and Türkiye with a different conservation status, and where adequate information was available, were analysed. Information on the 22 nesting sites was converted into scores based on the participants' expert knowledge. Independently on how the variable was named/described, higher scores always meant a condition beneficial for conservation (for instance, high and low habitat destruction were scored as 1 and 3, respectively).

A total of 37 response variables i) defining the current conservation status in terms of threats (n=13) and ii) explaining the current conservation status in terms of conservation measures (n=23) were identified (for an overview table of the variables, see the table in Annex X). One additional variable (clutch trend) was also included in the indicators of conservation measures because it is commonly used as a proxy of the conservation status. Variables about legislation were scored according to their enforcement. The 37 variables were grouped into 12 higher categories (Table 5.1) that were then used as variables in the following analysis.

The linear relation between response variables (defining the conservation status) and explanatory variables (explaining the conservation status) was investigated through linear models run by the *lm* function in R (R Development Core Team 2021). Three models were run for each of the three response variables, first with a complete set of possible explanatory variables:

```
V3 ~ V20+V22+V23+V26+V29+V44+V50
V5 ~ V20+V22+V23+V26+V30+V44+V50
V6 ~ V20+V22+V23+V26+V31+V44+V50
```

The first configuration was then reduced by the *step* function in R.

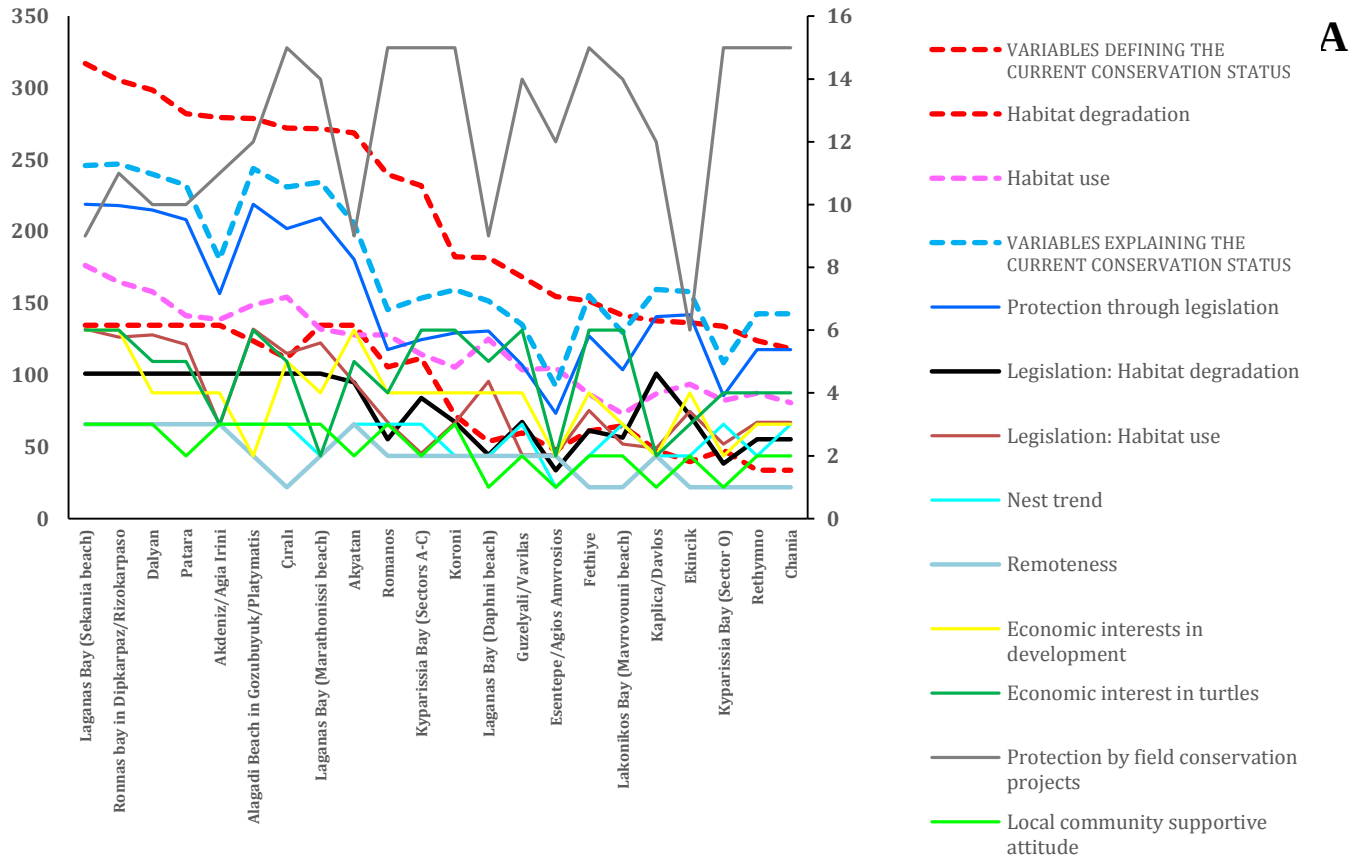
Variable description	Code
Trend of annual nest numbers in the last 10 years	**V20**
VARIABLES DEFINING THE CURRENT CONSERVATION STATUS	**V3**
Habitat degradation	**V5**
Habitat destruction (e.g. sand mining, flatening of dunes, building on dunes, erosion, heavy machinery)	
Obstacles (e.g. walls) to sea level rise adaptation (landwards beach shift)	
Constructions on or close to the beach (e.g. buildings, roads, seasonal facilities, parking areas)	
Constructions in the adjacent marine area (e.g. harbours, breakwaters)	
Habitat use	**V6**
Vehicles on the beach	
Beach use daylight (furnitures, human presence)	
Beach use night (human presence, noise, campfires, beach parties)	
Light pollution	
Pollution (e.g. oil, litter, trash)	
Speed boats and water sports	
Fishing close to shore	
Predation by anthropophilic species (e.g. canids, rats)	
Human-related parameters: Future prospect (expected anthropogenic impact/long-term viability)	
VARIABLES EXPLAINING THE CURRENT CONSERVATION STATUS	
Remoteness (far from human aggregations or difficult to access)	**V22**
Economic interests in development (not related to turtles)	**V23**
Tourism (recreational acitivities)	
Other (not tourism)	
Economic interest in turtles (e.g. turtle watching)	**V26**
on the beach	
in water	
Protection through general or other local legislation.	**V26**
Legislation: Habitat degradation	**V30**
Habitat destruction (e.g. sand mining, flatening of dunes, building on dunes, erosion, heavy machinery)	
Obstacles (e.g. walls) to sea level rise adaptation (landwards beach shift)	
Constructions on or close to the beach (e.g. buildings, roads, seasonal facilities, parking areas)	
Constructions in the adjacent marine area (e.g. harbours, breakwaters)	
Legislation: Habitat use	**V31**
Vehicles on the beach	
Beach use daylight (furnitures, human presence)	
Beach use night (human presence, noise, campfires, beach parties)	
Light pollution	
Pollution (e.g. oil, litter, trash)	
Speed boats & water sports	
Fishing close to shore	
Predation by anthropophilic species (e.g. canids, rats)	
Mitigation measures/Protection by field conservation projects / organizations	**V44**
Public awareness	
Nest protection by structures (e.g. cages, fences)	
Nest protection by presence/patrolling	
Management of the hatching phase (e.g. corridors, hatchling manipulation)	
Promotion of light pollution minimization (e.g. convincing owners/hotels to screen lights)	
Local community supportive attitude	**V50**

Table 5.1 Variables describing the conservation status and the conservation measures at sea turtle nesting sites.

5.2. Results and Discussion

The scores of each variable for each nesting site resulting from the exercise are shown in Fig. 5.2.A. The full model with the highest-level response variable (V3) was reduced to V3 ~ V22+V29+V50. *Remoteness* (V22), *Protection through legislation* (V29) and *Local community supportive attitude* (V50) showed a significant relation ($p<0.05$) with the whole score of *Current conservation status* (V3). The full model with V5 response variable (*Legislation on habitat degradation*) was reduced to V5 ~ V20+V22+V30+V50. *Remoteness* (V22) and *Local community supportive attitude* (V50) showed a significant relation ($p<0.05$) with *Current conservation status in terms of habitat degradation* (V5) and *Protection through legislation focused on habitat degradation* (V30) may have a relation too ($p=0.08$). The full model with V6 response variable (*Legislation on habitat use*) was reduced to V6 ~ V22+V31+V50. *Remoteness* (V22) and *Protection through legislation focused on habitat use* (V31) showed a significant relation ($p<0.05$) with *Current conservation status in terms of habitat use* (V6). *Local community supportive attitude* (V50) may have a relation too ($p=0.06$). Significant or nearly-significant variables are shown in Fig. 5.2-B.

As explained above (section 4.2.2), contrary to common belief, clutch trends did not show any relation with the conservation status of the nesting sites. *Protection through field projects* also did not show a relation to the conservation status of the nesting sites. However, the local community supportive attitude did, and it may be promoted by field projects too. Therefore, field projects may contribute in several ways, but their direct impact is not obvious. Economic interest in development or marine turtle conservation did not show a relation either, although the latter is generally not far spread in the Mediterranean. Enforced legislation appears to be a key factor for mitigating habitat use but less for mitigating habitat degradation. The opposite was observed for local community supportive attitudes, which appear to be a key factor for mitigating habitat degradation but less for mitigating habitat use. Finally, *Remoteness* was a good predictor of both habitat degradation and use.



B

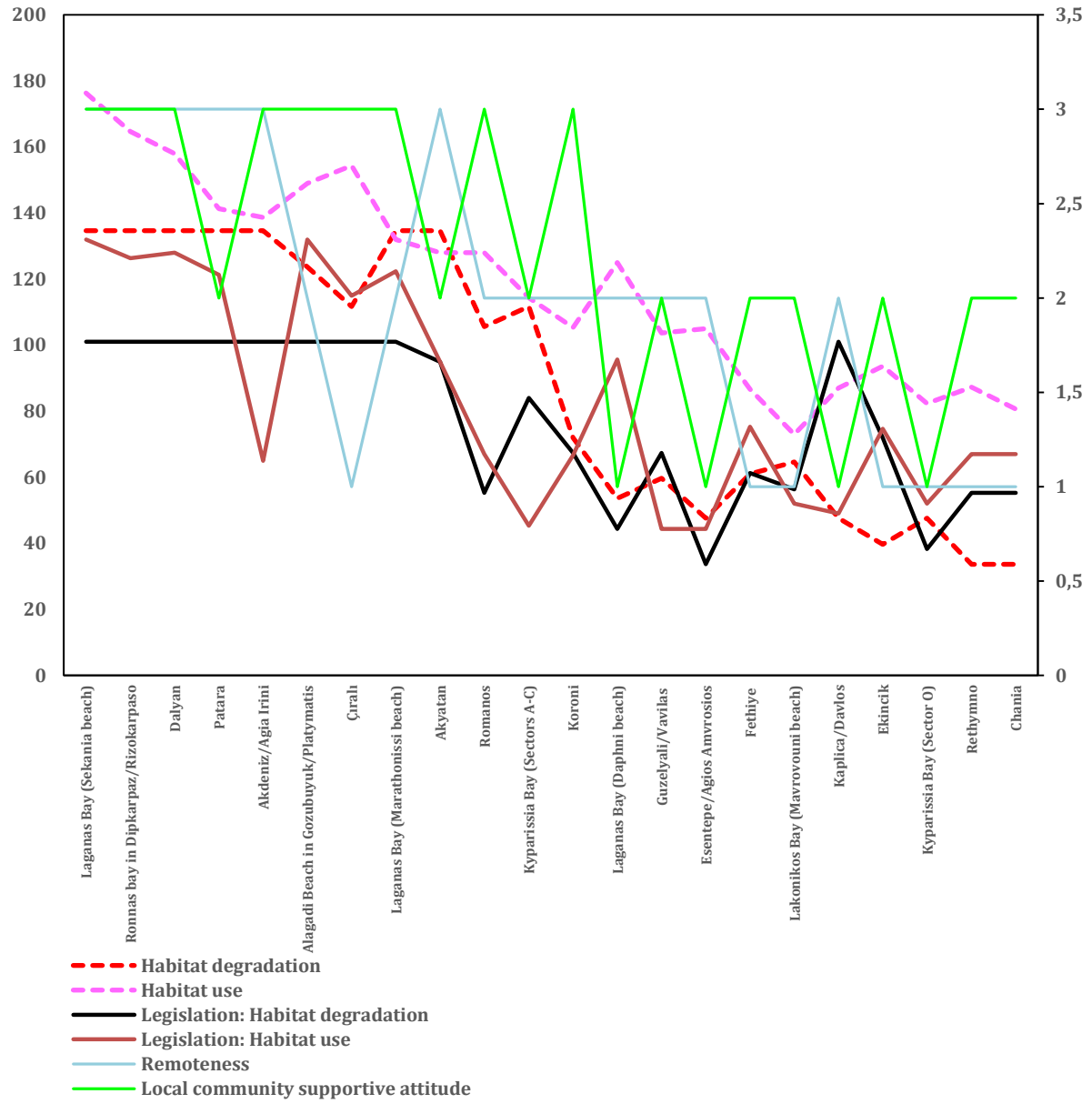


Fig. 5.2
A. *All variables considered for 22 sea turtle nesting sites (ordered left-right by the scores of the grouping variable Current conservation status).*
B. *Simplified version of Fig. 5.2-A with only significant or nearly significant variables shown.*

6. CONLUSIONS AND SUGGESTIONS FOR ACTION

6.1 Conclusions

From what is reported in the previous sections about the Bern Convention's open and possible case files, the following conclusions can be derived:

- All parties have a general tendency to rely on their perceptions or on expert opinions, based on anecdotal information. This tendency may be in part enhanced by the typical Bern Convention's approach of having on-the-spot appraisals conducted by experts;
- Complainants (and civil society) and Governments tend to focus on different types of information/evidence, resulting in a different interpretation of the conservation status of a nesting site. Consequently, their positions remain different and tend to crystalize with time;
- when evidence is sought, different types of evidence are considered (e.g., law violations, threats, biological indicators, management, new legislations/regulations) but they are not quantified in a way that allows them to be monitored in time or to be properly analysed in relation to threats and therefore to rank the different threats in terms of impact on the sea turtle population;
- the proper turtle-related indicators of the status of nesting sites are not reported or even mentioned to support claims of negative of positive status - except for Türkiye - despite the fact that probably the relevant data have been collected for decades by the local conservation organizations
- The most common biological indicator mentioned (trends of clutch counts) cannot inform about the conservation status of a nesting site;
- Enforced legislation appears to be important for conserving a nesting site – as believed by most stakeholders – and especially against the habitat use by humans. However, it may need support from the local community.
- Engaging local communities is probably pivotal for long-term successful conservation, however no system is in place to promote and monitor the public awareness activities and their success;

From the consultations had, remoteness appears to be a key factor for maintaining a nesting site in a good status.

6.2 Suggestions for action

This paragraph aims to provide a set of suggestions for action to national and local authorities and institutions, and to other stakeholders (environmental conservationist, academia) that can contribute to the conservation of marine turtles, through prevention, monitoring and enforcement.
To do so, it is essential to strengthen a sustainable collaborative approach to marine turtles conservation and base any conservation action on solid scientific evidences.

- Draw lessons from less successful conservation cases to improve management in other sites before they are degraded too.
- Identify all remote sites and those that are at risk of becoming more accessible in the future to anticipate potential threats.
- Implement existing laws, regulations, spatial development plans and Marine Spatial Plans (where exist). This should be a priority pursued jointly by national, regional and local

authorities. Special focus should be on development of new Marine Spatial Plans as they are the best instrument to capture the totality of the marine turtle ecosystem.

- Assess and monitor the impact of each specific threat on sea turtles.
  While monitoring violation of the law is important (especially for threats regarding habitat degradation and future scenarios), the impact of each specific threat on sea turtles should be assessed and monitored through monitoring anthropogenic threats and sea turtle biological indicators.
  Expert opinion can be valuable in contexts with lack of information about the conservation status of a nesting site and in cases where only the precautionary principle can be implemented (e.g. newly discovered nesting sites or where no annual field work was conducted). However, where information does exist about sea turtle reproduction and anthropogenic threats, empirical scientific evidence should be used to assess and monitor in real time the impact of anthropogenic threats. The three countries and the specific sites with case-files have a long history of sea turtle monitoring programs that could easily provide the necessary information.
- Identify and pursue the best strategy to engage local communities at each nesting site. Such activities and their success should be monitored and assessed.
- Improve communication among national stakeholders creating regular occasions for positive confrontation in dedicated fora. Making use of a more standardized monitoring system suggested in these Guidance toolbox (see below) to evaluate the conservation status of nesting sites would help all stakeholders to have a more active role in identifying specific recommendations for the local needs instead of receiving such recommendations from the Bern Convention.

6.3 Toolbox

This section aims to translate the findings and conclusions reported in the previous sections into practical steps. The specific objectives of these activity suggestions are: (i) monitor the conservation status of a nesting site in terms of the impact of potential anthropogenic threats, (ii) engage local communities, (iii) use the monitoring results to improve communication and collaboration in order to identify and rank the most important threats and to identify and agree on strategies for sea turtle conservation.6

6.3.1 Monitoring the conservation status of a nesting site

At present, the understanding of the relationship between conservation status and conservation measures is limited to exercises based to expert knowledge (see section 5). To improve such exercises and to allow a proper monitoring of the conservation status of a nesting site, proper indicators should be measured. As described in section 4, the conservation status of a nesting site is determined by its productivity (current or foreseen) in terms of number of hatchlings and their sex ratio (KBVs). To assess the effect of supposed anthropogenic threats on the KBVs, four types of indicators (for a total of 18 indicators) should be monitored: (i) anthropogenic threats, (ii) beach features, (iii) turtle biological indicators, (iv) mitigating measures.

Anthropogenic threats (4)	Turtle biological indicators (7)
Direct monitoring of each suspected anthropogenic threat is fundamental to relate them to observed changes of biological or beach indicators. This is not an easy task to undertake and the most suitable approach should be chosen based	Monitoring the five primary biological variables outlined in section 4.2.2 may be not informative (C) or difficult (IS, SS, WS, SR) and other indicators can be used for monitoring the conservation status of a nesting site. Specifically, this means (Table 6.3.1):

on the local context, keeping in mind that the aim is to detect spatial distribution and change with time (including appearance and removal) of anthropogenic threats. Examples are given below. In order to be useful, the indicators should be standardized at least at nesting site level.

- Hard constructions (HC), their distance to the landward boundary of the sandy beach and their description.
- Human density (HD) on the beach at night and in the daytime.
- Obstacle density (OD) on the beach at night and in the daytime.
- Light Pollution (LP) visible on the beach at night.

Beach features (3)

As described above, certain anthropogenic factors may alter the physical features of the nesting site. Therefore, monitoring these features may help understanding the real impact of those anthropogenic factors. The following variables are proposed:

- Beach width (BW).
- Sand colour (SC) can be a proxy of sand composition (e.g., mixing with mud).
- Beach profile (BP).

Mitigating measures (4)

Some conservation activities are very intensive and specific and can almost eliminate the effect of some anthropogenic threats. This should be considered because it can lead to an underestimation of the importance of the threats. Other conservation activities are aimed to engage local communities. As this may be an important factor for other conservation initiatives, an indicator for this engagement would be useful too.

- In situ clutch protection (CP) through cages or fences can avoid human disturbance on the eggs as well as predation.
- Relocation (RE) of clutches to a different position or even in common

- Changes of C are mainly due to factors at sea or to a population productivity that occurred decades ago (i.e. a period equal to the age of turtle sexual maturity). Therefore, possible emerging effects of anthropogenic threats on the nesting phase may be better monitored through another variable: nesting success (NS; proportion of female emergence resulting in egg deposition). As explained above, a reduction in NS does not necessarily mean that the total number of clutches (C) is reduced. However, it may warn about a possible problem.
- To calculate IS and SS, F is needed, but it is difficult to estimate. Therefore, monitoring HS and ES is an easier option under the assumption of a constant F.
- Predators can destroy a whole clutch (i.e. IS=SS=0) or just parts of it (with reduction of IS and SS) (Kaska 2000). Therefore, the proportion of predated clutches (PC) is an important variable to measure, and it can help in calculating overall HS and ES (including predation).
- WS is difficult to assess directly. If the primary interest is to assess the effect of light pollution, then an orientation index (OI) would represent the best proxy and a relatively easier variable to measure, under the assumption that WS mostly depends on OI. However, even with a good orientation, hatchlings may have a high mortality due to predators that could nullify positive scores of all other variables and conservation measures. Therefore, assessing this predation on hatchlings on the beach (PH) would be interesting where predation is suspected, but is extremely difficult to obtain because information about the fate of every single hatchling (at least of sample clutches) crawling on the beach would be required. There may be factors other than orientation and predation that decrease WS. For instance some hatchlings may simply not reach the shore because they get weak or entrapped in vegetation or pits.
- A direct estimation of SR requires using invasive methods like killing hatchlings to examine their gonads (Kaska et al. 2006) or sampling their blood (Tezak et al. 2020). Such approaches may not be feasible or acceptable in local contexts. Alternatively, SR can be indirectly inferred from incubation temperature during the thermosensitive period of development (TSP,

hatcheries can increase ES (for clutches close to the sea and subject to be washed over) and avoid human disturbance on the eggs as well as predation. - Assisted hatchling emergence (AE) (e.g. corridors, guidance by torch, release in or near the water) can help hatchlings reaching the sea avoiding mis- and disorientation by light pollution as well as predation. - Local community engagement (CE).	when temperature affects the embryo's sex, corresponding to the middle third of development) (Kaska et al. 2006) or from incubation period (IP) (Mrosovsky et al. 1999). IP is a proxy of the mean incubation temperature during the entire incubation period and therefore cannot indicate the temperature during TSP and is less accurate because normally temperature is not constant during the IP. However, IP is very easy to monitor and, although it cannot provide precise estimates of SR, spatio-temporal differences of IP may indicate different incubation temperature and hence different SR (Mrosovsky et al. 1999).

An example of a monitoring from based on the variables above is provided in Annex III.

6.3.1.1. Nesting site subareas and geolocation

Individual anthropogenic threats (single sources of disturbance) may be local and not distributed all over the nesting site. This is a valuable opportunity to assess their impact through comparison with biological or physical variables. In this respect, two actions are required: (i) division of the nesting site into well-defined and permanent sectors, representing the coastal unit where comparisons can be made and (ii) information on geolocation (GPS) of all threats and monitored indicators that are then associated with the specific sectors.

6.3.1.2 Monitoring protocols

Naturally, different methods are needed to measure the 18 indicators described above. However, the necessary data for most of them (except OI, PH and CE) are already collected by conservation/research teams working at sea turtle nesting sites or can easily be collected through the activities typically conducted.

- Single or few surveys (**HC, HD, OD, LP, BW, SC, BP, CE**). Given that hard constructions need time to appear and beach features require time to change, HC, BW, SC, and BP may be assessed once per nesting season, unless changes occur during the nesting season.
  - HC can be measured as % of coastline with constructions. Other two data provide the necessary supporting information to describe this indicator: linear distance to the landward boundary of the sandy beach (m) and types of constructions (according to standardized categories).
  - BW can be measured as linear distance (m) from the high tide line to the dune or the end of the sandy zone.
  - SC can be measured through photos (taken in the same spot in different years) with standard colour reference. Possible changes in time or differences among different site sectors can be assessed by visual comparison. These changes can be described in terms of „stable", „darker", „brighter". Quantitative measure of the specific spot/time is more difficult but also not strictly necessary to assess changes.

- BP in terms of elevation at the landward boundary of the beach can be recorded through photos (taken in the same spot in different years). Possible changes in time or differences among different site sectors can be assessed by visual comparison. These changes can be described in terms of „stable“, „lower“, „higher“.Quantitavive measure of the specific spot/time is more difficult but also not strictly necessary to assess changes.
- CE can be represented by % of individuals with a „positive attitude“ in a sample of local people. It can be measured through one-time interviews from the main stakeholders (local citizens, local authorities, small to large economic enterprises) with a questionnaire aimed to detect the general attitude towards sea turtles and specific interests (e.g., ethical, economic) for their protection.

HD, OD and LP should be measured one or few times during the nesting/hatching season based on their variation (the more constant they are the fewer surveys needed).

- HD can be measured during the nesting season as the number of visitors per day, density (per linear or square meter) at the peak of the day, etc.
- OD can be measured during the nesting season as the number of obstacles per linear extension (m) of a costal part or % of coastline blocked by obstacles (from a nesting turtle point of view) (e.g., Fujisaki and Lamont 2016). Different values can be obtained per different obstacle types, if useful.
- LP can be measured during the hatching season (and possibly the nesting season too) as number of the brightest lights, presence of sky glow, and the light intensity during a new moon phase, i.e. with no moon light (e.g., Dimitriadis et al. 2018).

- Daily beach surveys (**NS, IP, PC**). The beach is surveyed daily at dawn (before any human activity can alter tracks) for all the nesting season in order to count and geolocate (GPS) each female emergence and to classify it as an emergence with or without a clutch. This can be done – depending on local rules/preferences - either by visual examination of the track or by assessing the presence of eggs (Demetropoulos and Hadjichristophorou 1995; Florida Fish and Wildlife Conservation Commission 2016). If daily surveys are not possible, samples over shorter periods may be considered, but the capacity to detect temporal changes will decrease. E=total number of emergences. C=total number of clutches.
  - NS=C/E

  Beach surveys (or specific monitoring of clutches) will also detect hatchling emergences and predation on clutches:
  - IP = date of first hatchling emergence - date of nesting
  - PC = number of clutches predated / C. A PC value for each different predator species should be obtained.

- Protection activities (**CP, RE, AE**). All protection activities should be recorded.
  - CP = number of clutches protected / C.
  - RE = number of clutches relocated / C.
  - AE = number of clutches with assisted emergence / C.

- Post-hatching nest inventory (**HS, ES**). If not all nests can be dug, sampling should be distributed along the nesting site and hatching season. After the last hatchling emergence, the nest is dug and the following counts are taken: unhatched eggs (U), hatched eggs (H) from the number of eggshell pieces larger than 50% of an entire eggshell (Ceriani et al. 2021), dead or

live hatchlings (T), pipped (P, inside a hatched egg) dead or alive (Florida Fish and Wildlife Conservation Commission 2016). CS= (U + H + P);

- HS= (H+P)/CS;
- ES=(H-T)/CS.

- Orientation measures (**OI**). Disorientation (reduced orientation, resulting in reduced movements or in circling around) and misorientation (orientation towards a target different from the natural one) can be measured, respectively, as (i) fan spread and (ii) offset angle. For method details see Dimitriadis et al. (2018).

- Observation of crawling hatchlings (**PH**). Inferring predation from hatchling tracks is very difficult. Direct observation is needed but technically challenging. For examples of possible methods see Erb and Wyneken (2019).

Anthropogenic impacts	**Anthropogenic threats (4)**				**Beach features (3)**			**Proxy biological indicators (7)**							**Mitigating measures (4)**			
	HC	**HD**	**OD**	**LP**	**BW**	**SC**	**BP**	**NS**	**HS**	**ES**	**OI**	**IP**	**PC**	**PH**	**CP**	**RE**	**AE**	**CE**
Beach reduction by hard constructions	✓				✓			✓	✓	✓		✓						✓
Alteration of sand composition	✓					✓			✓	✓		✓						✓
Alteration of beach profile	✓						✓	✓	✓			✓						✓
Disturbance by light pollution				✓				✓			✓						✓	✓
Obstacles on the beach			✓					✓	✓	✓		✓						✓
Disturbance of females while nesting		✓						✓										✓
Damage or disturbance of eggs		✓	✓						✓	✓		✓			✓	✓		✓
Predation by anthropophilic predators									✓	✓			✓	✓	✓	✓	✓	

Table 6.3.1. The 18 indicators proposed to monitor 8 anthropogenic impacts at sea turtle nesting sites. HC: hard constructions; HD: human density; OD: obstacle density; LP: light pollution; BW: beach width; SC: sand colour; BP: beach profile; NS: nesting success; HS: hatching success; ES: emergence success; OI: orientation index; IP: incubation period; PC: predated clutches; PH: predated hatchlings on the beach; CP: clutches protected; RE: clutches relocated; AE: clutches with assisted hatchling emergence; CE: community engagement.

6.3.2 Engage local community

As described above (sections 4.4 and 5), the positive attitude of local communities may be pivotal for the success of conservation measures at a nesting site. This positive attitude may be the result of different factors such as ethical/emotional affection and economic interest driven by non-consumptive use (section 4.3).

Since each nesting site has its specific features in terms of biological aspects of sea turtles and socio-economic aspects, stakeholders (government and civil society) may want to explore the best ways to enhance public awareness and the potential benefits (and drawbacks) of non-consumptive turtle use (in terms of economic value from indirect business activities or jobs positions) such as:

- facilities with live animals (e.g. rescue centers);
- turtle-watching at land: females while nesting;
- turtle-watching in-water: adults or juveniles.

6.3.3 Improve communication and collaboration in order to identify and agree on strategies for sea turtle conservation

A more standardized and less arbitrary monitoring protocol can improve communication among the main stakeholders (governmental agencies, civil society, business sector), avoid misunderstandings and facilitate cooperation. Multi-stakeholders meetings could be organized annually (in winter) to:

- Evaluate the monitoring results of the last sea turtle reproductive season.
- Identify - at their first appearance - any negative effects on sea turtles and their nesting habitat of anthropogenic threats as well as any positive effects of mitigating measures put in place.
- Compare different nesting sites in terms of lessons learned from less successful conservation cases.
- Agree on specific recommendations about additional conservation measures, if necessary, and implement them immediately.
- Provide the Bern Convention with the results of the monitoring (indicators, their changes and interpretation) and agreed conservation strategies.

ANNEXES

I. List of acronyms
II. Questionnaires national consultations
III. Example of Monitoring form

ANNEX I: List of acronyms

AE:	Assisted hatchling emergence
BP:	Beach profile
BW:	Beach width
C:	Number of clutches laid at the nesting site
CE:	Local community engagement
CP:	In situ clutch protection
CS:	Average clutch size (number of eggs per clutch)
ES:	Emergence success (proportion of hatchlings that emerge on the beach surface to the total eggs laid)
F:	Average fertility (proportion of fertile eggs on the total CS)
HC:	Hard constructions
HD:	Human density
HS:	Hatching success (proportion of hatched eggs to total eggs laid)
IP:	Incubation period
IS:	Average incubation success (proportion of fertile eggs that hatch)
KBV:	Key biological variables
LP:	Light Pollution
OD:	Obstacle density
OI:	Orientation index
PH:	predation on hatchlings on the beach
RE:	Relocation
SC:	Sand colour
SR:	Sex ratio
SS:	Average surfacing survival (proportion of hatchlings that emerge at beach surface)
WS:	Average water entering success (proportion of emerged hatchlings that enter the sea).

ANNEX II: Questionnaires national consultations

As part of Bern Convention initiative on the conservation of marine turtles, a first round of consultations with relevant national stakeholders of Cyprus, Greece and Turkey took place at national level between October 2021 and February 2022. These consultations focused on identifying obstacles and ways forward to the implementation of the Recommendations of the Standing Committee and on setting up a platform of exchange and collaboration.

The meetings were facilitated by the expert Mr Ivica Trumbic in close collaboration with the expert Mr Paolo Casale. To make the best use of the meeting time, a questionnaire was prepared by the two experts, in coordination with representatives of key parties to the case-file, and shared with the national stakeholders prior to the meetings.

The questionnaire was divided in two parts:

A. Questions to the two main actors (Government and Complainant organisation);
B. Questions to the key stakeholders identified by the previous step.

Part A was meant for the Complainant organisation of the case-file(s) and to the relevant Ministry in charge for follow up on the case-file(s). Part B was addressed to all remaining stakeholders invited to the consultation meetings. However, not all complainant organisations and relevant Ministry in charge for follow up on the case-file(s) replied to the questionnaire and most of the remaining stakeholders compiled both section A and B of the questionnaire.

The questions of the questionnaire were also slightly modified for Greece and Turkey following the inputs from Complainant Organisations and relevant Ministries. Changes in the text have been highlighted in red.

For questions asking to provide an answer for each of the sites interested by the Bern Convention Recommendations, if the respondents didn't provide an answer for each site, it was considered that the same answer applied to all sites.

The answers were considered N/A in the following cases:

- answer not given;
- two answers provided to questions where multiple answers were not foreseen;
- unclear answers."

This report presents the findings in the three Contracting Parties**.**

The questionnaire aimed to assess the situation and challenges in relation to the site concerned by the case-file, the Akamas peninsula, and to identify the main issues to be discussed during the online meetings.
In total, four civil society actors and two representatives of Cypriot authorities submitted replies to the questionnaire. Two civil society organisations submitted a consolidated reply to the questionnaire, the responses were considered separately, therefore counted twice.

this sheet analyses multiple choices questions only

Civil Society stakeholders		Governmental stakeholders		In Total	
# of responses	4	# of responses	2	# of responses	6

QUESTIONS TO THE TWO MAIN ACTORS (GOV AND COMPLAINANT)

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	75%
b. Adequate	25%
c. Excessive	0%
N/A	0%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	100%
c. Excessive	0%
N/A	0%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	50%
b. Adequate	50%
c. Excessive	0%
N/A	0%

2. With the present level of protection, what will be the long-term fate of sea turtles in the country and in each of the sites interested by the Bern Convention recommendations?	
a. Declining	75%
b. Stable	0%
c. Increasing	25%
N/A	0%

2. With the present level of protection, what will be the long-term fate of sea turtles in the country and in each of the sites interested by the Bern Convention recommendations?	
a. Declining	0%
b. Stable	50%
c. Increasing	50%
N/A	0%

2. With the present level of protection, what will be the long-term fate of sea turtles in the country and in each of the sites interested by the Bern Convention recommendations?	
a. Declining	50%
b. Stable	17%
c. Increasing	33%
N/A	0%

3. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	50%
b. Adequate	50%
c. Excessive	0%
N/A	0%

3. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	100%
c. Excessive	0%
N/A	0%

3. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	33%
b. Adequate	67%
c. Excessive	0%
N/A	0%

4. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	25%
b. Lack of funds	6%
c. Opposition by local stakeholders	19%
d. Lack of enforcement capacity	25%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	0%
f. The recommendations are not binding	25%
g. Other	0%
N/A	0%

4. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	0%
b. Lack of funds	0%
c. Opposition by local stakeholders	40%
d. Lack of enforcement capacity	20%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	20%
f. The recommendations are not BGnding	0%
g. Other	20%
N/A	0%

4. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	19%
b. Lack of funds	5%
c. Opposition by local stakeholders	24%
d. Lack of enforcement capacity	24%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	5%
f. The recommendations are not BGnding	19%
g. Other	5%
N/A	0%

6. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	23%
b. Allocate funds	23%
c. Engage local stakeholders	23%
d. Improve enforcement capacity	31%
e. Other	0%
N/A	0%

6. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	0%
b. Allocate funds	0%
c. Engage local stakeholders	50%
d. Improve enforcement capacity	50%
e. Other	0%
N/A	0%

6. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	18%
b. Allocate funds	18%
c. Engage local stakeholders	29%
d. Improve enforcement capacity	35%
e. Other	0%
N/A	0%

8. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	0%
c. Land use plan	50%
d. Project	0%
e. Other	25%
N/A	25%

9. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	0%
b. No	75%
N/A	25%

11. there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	25%
b. Yes, in the process of adoption	0%
c. No	75%
N/A	0%

12. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	0%
b. No	100%
N/A	0%

8. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	33%
c. Land use plan	67%
d. Project	0%
e. Other	0%
N/A	0%

9. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	50%
b. No	0%
N/A	50%

11. there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	0%
b. Yes, in the process of adoption	50%
c. No	50%
N/A	0%

12. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	0%
b. No	0%
N/A	100%

8. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	14%
c. Land use plan	57%
d. Project	0%
e. Other	14%
N/A	14%

9. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	17%
b. No	50%
N/A	33%

11. there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	17%
b. Yes, in the process of adoption	17%
c. No	67%
N/A	0%

12. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	0%
b. No	67%
N/A	33%

14. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	75%
b. No	25%
N/A	0%

14. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	0%
b. No	100%
N/A	0%

14. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	50%
b. No	50%
N/A	0%

16. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' habitat	50%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	33%
c. There is no protected area defined.	0%
d. Other	17%
N/A	0%

16. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' habitat	67%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	33%
c. There is no protected area defined.	0%
d. Other	0%
N/A	0%

16. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' habitat	56%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	33%
c. There is no protected area defined.	0%
d. Other	11%
N/A	0%

17. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by lAU in the area in question?	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	50%
d. No setback	50%
N/A	0%

17. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by lAU in the area in question?	
a. Yes, 100 metres	50%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	0%
d. No setback	0%
N/A	50%

17. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by lAU in the area in question?	
a. Yes, 100 metres	17%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	33%
d. No setback	33%
N/A	17%

QUESTIONS TO THE KEY STAKEHOLDERS IDENTIFIED BY THE PREVIOUS STEP

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	25%
b. No	50%
N/A	25%

3. With the present level of protection, what will be the long-term fate of sea turtles in the country and in each of the sites interested by the Bern Convention recommendations? (please provide separate answers for each country/site)	
a. Declining	75%
b. Stable	0%
c. Increasing	25%
N/A	0%

4. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	75%
b. Adequate	25%
c. Excessive	0%
N/A	0%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	50%
b. No	0%
N/A	50%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	50%
b. No	0%
N/A	50%

3. With the present level of protection, what will be the long-term fate of sea turtles in the country and in each of the sites interested by the Bern Convention recommendations? (please provide separate answers for each country/site)	
a. Declining	0%
b. Stable	0%
c. Increasing	50%
N/A	50%

4. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	50%
c. Excessive	0%
N/A	50%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	83%
b. No	0%
N/A	17%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	25%
b. No	50%
N/A	25%

3. With the present level of protection, what will be the long-term fate of sea turtles in the country and in each of the sites interested by the Bern Convention recommendations? (please provide separate answers for each country/site)	
a. Declining	50%
b. Stable	33%
c. Increasing	0%
N/A	17%

4. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	50%
b. Adequate	33%
c. Excessive	0%
N/A	17%

5. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	100%
b. No	0%
N/A	0%

6. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	75%
N/A	25%

7. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)? (please provide details in addition to the short answer)	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	23%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	23%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	23%
d. Pollution	15%
e. Fishing	8%
f. Other	0%

5. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	50%
b. No	0%
N/A	50%

6. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	50%
N/A	50%

7. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)? (please provide details in addition to the short answer)	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	25%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	25%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	25%
d. Pollution	0%
e. Fishing	0%
f. Other	0%

5. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	83%
b. No	0%
N/A	17%

6. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	67%
N/A	33%

7. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)? (please provide details in addition to the short answer)	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	24%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	24%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	24%
d. Pollution	12%
e. Fishing	6%
f. Other	0%

g. There is no threat	0%
N/A	8%

8. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public Awareness towards tourists	7%
b. Raising public Awareness of the local community	21%
c. New regulations to reduce the impact of threats	21%
d. Enforcement of existing regulations to reduce the impact of threats	21%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	21%
f. Nothing (there is no problem)	0%
N/A	7%

g. There is no threat	0%
N/A	25%

8. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public Awareness towards tourists	20%
b. Raising public Awareness of the local community	20%
c. New regulations to reduce the impact of threats	20%
d. Enforcement of existing regulations to reduce the impact of threats	20%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	0%
f. Nothing (there is no problem)	0%
N/A	20%

g. There is no threat	0%
N/A	12%

8. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public Awareness towards tourists	11%
b. Raising public Awareness of the local community	21%
c. New regulations to reduce the impact of threats	21%
d. Enforcement of existing regulations to reduce the impact of threats	21%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	16%
f. Nothing (there is no problem)	0%
N/A	11%

The questionnaire aimed to assess the situation and challenges in relation to the sites concerned by the case-file, Kyparissia and Laganas Bay, and to identify the main issues to be discussed during the online meetings.
In total, three civil society actors, four representatives of Greek authorities and one economic actor submitted their replies to the questionnaire. Three governmental stakehodlers submitted a consolidated reply to the questionnaire, the responses were considered separately, therefore counted three times.

this sheet analyses multiple choices questions only

Civil Society stakeholders		Governmental stakeholders		Economic stakeholders		In Total	
# of responses	3	# of responses	4	# of responses	1	# of responses	8

QUESTIONS TO THE TWO MAIN ACTORS (GOV AND COMPLAINANT)

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	33%
b. Adequate	33%
c. Excessive	0%
N/A	33%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	100%
c. Excessive	0%
N/A	0%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	0%
c. Excessive	0%
N/A	100%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	13%
b. Adequate	63%
c. Excessive	0%
N/A	25%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	0%
c. Increasing	0%
N/A	100%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	75%
c. Increasing	25%
N/A	0%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	0%
c. Increasing	0%
N/A	100%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	38%
c. Increasing	13%
N/A	50%

3a. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Kyparissia)

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Kyparissia)

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Kyparissia)

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Kyparissia)

a. Declining	0%
b. Stable	0%
c. Increasing	33%
N/A	67%

a. Declining	0%
b. Stable	75%
c. Increasing	0%
N/A	25%

a. Declining	0%
b. Stable	0%
c. Increasing	0%
N/A	100%

a. Declining	0%
b. Stable	38%
c. Increasing	13%
N/A	50%

3b. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Laganas)	
a. Declining	0%
b. Stable	33%
c. Increasing	0%
N/A	67%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Laganas)	
a. Declining	0%
b. Stable	75%
c. Increasing	25%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Laganas)	
a. Declining	0%
b. Stable	0%
c. Increasing	0%
N/A	100%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Laganas)	
a. Declining	0%
b. Stable	50%
c. Increasing	13%
N/A	38%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	33%
b. Adequate	0%
c. Excessive	0%
d. Other	0%
N/A	67%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	75%
c. Excessive	0%
d. Other	25%
N/A	0%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	0%
c. Excessive	0%
d. Other	0%
N/A	100%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	13%
b. Adequate	38%
c. Excessive	0%
d. Other	13%
N/A	38%

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	11%
b. Lack of funds	11%
c. Opposition by local stakeholders	22%
d. Lack of enforcement capacity	22%

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	0%
b. Lack of funds	0%
c. Opposition by local stakeholders	0%
d. Lack of enforcement capacity	0%

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	0%
b. Lack of funds	0%
c. Opposition by local stakeholders	0%
d. Lack of enforcement capacity	0%

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?	
a. Lack of legal instruments	7%
b. Lack of funds	7%
c. Opposition by local stakeholders	14%
d. Lack of enforcement capacity	14%

e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	0%
f. The recommendations are not Binding	11%
g. Other	11%
N/A	11%

e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	75%
f. The recommendations are not Binding	0%
g. Other	25%
N/A	0%

e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	0%
f. The recommendations are not Binding	0%
g. Other	0%
N/A	100%

e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	21%
f. The recommendations are not BGnding	7%
g. Other	14%
N/A	14%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	20%
b. Allocate funds	20%
c. Engage local stakeholders	20%
d. Improve enforcement capacity	20%
e. Other	10%
N/A	10%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	0%
b. Allocate funds	0%
c. Engage local stakeholders	44%
d. Improve enforcement capacity	44%
e. Other	11%
N/A	0%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	0%
b. Allocate funds	0%
c. Engage local stakeholders	0%
d. Improve enforcement capacity	0%
e. Other	0%
N/A	100%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	10%
b. Allocate funds	10%
c. Engage local stakeholders	30%
d. Improve enforcement capacity	30%
e. Other	10%
N/A	10%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	0%
c. Land use plan	50%
d. Project	25%
e. Management Plan	0%
f. Other	0%
N/A	25%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	0%
c. Land use plan	0%
d. Project	0%
e. Management Plan	0%
e. Other	100%
N/A	0%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	0%
c. Land use plan	0%
d. Project	0%
e. Management Plan	0%
e. Other	0%
N/A	100%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	0%
c. Land use plan	22%
d. Project	11%
e. Management Plan	0%
e. Other	44%
N/A	22%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	67%
b. No	0%
N/A	33%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	100%
b. No	0%
N/A	0%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	0%
b. No	0%
N/A	100%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	75%
b. No	0%
N/A	25%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	33%
b. Yes, in the process of adoption	0%
c. No	0%
N/A	67%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	25%
b. Yes, in the process of adoption	0%
c. No	0%
N/A	75%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	0%
b. Yes, in the process of adoption	0%
c. No	0%
N/A	100%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	25%
b. Yes, in the process of adoption	0%
c. No	0%
N/A	75%

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	0%
b. No	0%
N/A	100%

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	25%
b. No	0%
N/A	75%

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	0%
b. No	0%
N/A	100%

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?	
a. Yes	13%
b. No	0%
N/A	88%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	33%
b. No	0%
N/A	67%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	100%
b. No	0%
N/A	0%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	0%
b. No	0%
N/A	100%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	63%
b. No	0%
N/A	38%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' haBGtat	0%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	67%
c. There is no protected area defined.	0%
d. Other	0%
N/A	33%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' haBGtat	0%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	100%
c. There is no protected area defined.	0%
d. Other	0%
N/A	0%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' haBGtat	0%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	0%
c. There is no protected area defined.	0%
d. Other	0%
N/A	100%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' haBGtat	0%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	75%
c. There is no protected area defined.	0%
d. Other	0%
N/A	25%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Kyparissia)	
a. Yes, 100 metres	33%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	0%
d. No setback	33%
N/A	33%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Kyparissia)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	75%
d. No setback	0%
N/A	25%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Kyparissia)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	0%
d. No setback	0%
N/A	100%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Kyparissia)	
a. Yes, 100 metres	13%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	38%
d. No setback	13%
N/A	38%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Laganas)	
a. Yes, 100 metres	33%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	0%
d. No setback	33%
N/A	33%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Laganas)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	25%
d. No setback	0%
N/A	75%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Laganas)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	0%
d. No setback	0%
N/A	100%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Laganas)	
a. Yes, 100 metres	13%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	13%
d. No setback	13%
N/A	63%

QUESTIONS TO THE KEY STAKEHOLDERS IDENTIFIED BY THE PREVIOUS STEP

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	67%
b. No	0%
N/A	33%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	88%
b. No	0%
N/A	13%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	33%
b. No	33%
N/A	33%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	75%
b. No	13%
N/A	13%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	0%
b. Stable	33%
c. Increasing	0%
N/A	67%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	0%
b. Stable	75%
c. Increasing	25%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	0%
b. Stable	100%
c. Increasing	0%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	0%
b. Stable	63%
c. Increasing	13%
N/A	25%

4a. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Kyparissia)	
a. Declining	0%
b. Stable	33%
c. Increasing	33%
N/A	33%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Kyparissia)	
a. Declining	0%
b. Stable	75%
c. Increasing	25%
N/A	0%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Kyparissia)	
a. Declining	0%
b. Stable	100%
c. Increasing	0%
N/A	0%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Kyparissia)	
a. Declining	0%
b. Stable	63%
c. Increasing	25%
N/A	13%

4b. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Laganas)	
a. Declining	0%
b. Stable	67%
c. Increasing	0%
N/A	33%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Laganas)	
a. Declining	0%
b. Stable	75%
c. Increasing	25%
N/A	0%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Laganas)	
a. Declining	0%
b. Stable	100%
c. Increasing	0%
N/A	0%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Laganas)	
a. Declining	0%
b. Stable	75%
c. Increasing	13%
N/A	13%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	67%
b. Adequate	0%
c. Excessive	0%
N/A	33%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	100%
c. Excessive	0%
N/A	0%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	100%
c. Excessive	0%
N/A	0%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	25%
b. Adequate	63%
c. Excessive	0%
N/A	13%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	67%
b. No	0%
N/A	33%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	100%
b. No	0%
N/A	0%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	100%
b. No	0%
N/A	0%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	88%
b. No	0%
N/A	13%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	0%
N/A	100%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	100%
N/A	0%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	100%
N/A	0%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%
b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	63%
N/A	38%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	17%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	17%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	8%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	20%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	20%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	20%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	0%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	0%
c. Human presence and light pollution at night (that disorient	0%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting haBGtat (sandy beach) that becomes unavailable to turtles	18%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	18%
c. Human presence and light pollution at night (that	14%

d. Pollution	17%
e. Fishing	17%
f. Other	17%
g. There is no threat	0%
N/A	9%

d. Pollution	7%
e. Fishing	27%
f. Other	7%
g. There is no threat	0%
N/A	0%

hatchlings in their route to the sea)	
d. Pollution	100%
e. Fishing	0%
f. Other	0%
g. There is no threat	0%
N/A	0%

disorient hatchlings in their route to the sea)	
d. Pollution	14%
e. Fishing	21%
f. Other	11%
g. There is no threat	0%
N/A	4%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	22%
b. Raising public AUareness of the local community	22%
c. New regulations to reduce the impact of threats	11%
d. Enforcement of existing regulations to reduce the impact of threats	22%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	11%
f. Nothing (there is no problem)	0%
N/A	11%
Total	100%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	24%
b. Raising public AUareness of the local community	24%
c. New regulations to reduce the impact of threats	24%
d. Enforcement of existing regulations to reduce the impact of threats	24%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	6%
f. Nothing (there is no problem)	0%
N/A	0%
Total	100%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	33%
b. Raising public AUareness of the local community	33%
c. New regulations to reduce the impact of threats	33%
d. Enforcement of existing regulations to reduce the impact of threats	0%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	0%
f. Nothing (there is no problem)	0%
N/A	0%
Total	100%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	24%
b. Raising public AUareness of the local community	24%
c. New regulations to reduce the impact of threats	21%
d. Enforcement of existing regulations to reduce the impact of threats	21%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	7%
f. Nothing (there is no problem)	0%
N/A	3%
Total	100%

The questionnaire aimed to assess the situation and challenges in relation to the sites concerned by the case-file, Fethiye and Patara SPAs, and to identify the main issues to be discussed during the online meetings.
In total, eight civil society actors, six representatives of Turkish authorities and one economic actor submitted their replies to the questionnaire. Two separate answers were received by the same civil society organisation, three and two separate answers by the same governmental entities, these were considered as separate answers.

this sheet analyses multiple choices questions only

Civil Society stakeholders		Governmental stakeholders		Economic stakeholders		In Total	
# of responses	8	# of responses	6	# of responses	1	# of responses	15

QUESTIONS TO THE TWO MAIN ACTORS (GOV AND COMPLAINANT)

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	25%
b. Adequate	63%
c. Excessive	0%
N/A	13%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	17%
b. Adequate	67%
c. Excessive	17%
N/A	0%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	0%
b. Adequate	100%
c. Excessive	0%
N/A	0%

1. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	20%
b. Adequate	67%
c. Excessive	7%
N/A	7%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	63%
c. Increasing	13%
N/A	25%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	33%
c. Increasing	67%
N/A	0%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

2. With the present level of protection, what will be the long-term fate of sea turtles in country ?	
a. Declining	0%
b. Stable	47%
c. Increasing	40%
N/A	13%

3a. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Fethiye)	
a. Declining	38%
b. Stable	13%
c. Increasing	13%
N/A	38%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Fethiye)	
a. Declining	0%
b. Stable	67%
c. Increasing	33%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Fethiye)	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Fethiye)	
a. Declining	20%
b. Stable	33%
c. Increasing	27%
N/A	20%

3b. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Patara)	
a. Declining	25%
b. Stable	25%
c. Increasing	25%
N/A	25%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Patara)	
a. Declining	0%
b. Stable	50%
c. Increasing	50%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Patara)	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention Recommendations? (Patara)	
a. Declining	13%
b. Stable	33%
c. Increasing	40%
N/A	13%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	88%
c. Excessive	0%
d. Other	0%
N/A	13%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	83%
c. Excessive	17%
d. Other	0%
N/A	0%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	0%
c. Excessive	100%
d. Other	0%
N/A	0%

4. How can the Bern Convention recommendations for ensuring sea turtles conservation be described?	
a. Insufficient	0%
b. Adequate	80%
c. Excessive	13%
d. Other	0%
N/A	7%

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?

5. Which main factors did impede the Bern Convention recommendations to be implemented so far?

a. Lack of legal instruments	8%
b. Lack of funds	16%
c. Opposition by local stakeholders	20%
d. Lack of enforcement capacity	20%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	12%
f. The recommendations are not Binding	16%
g. Other	4%
N/A	4%

a. Lack of legal instruments	0%
b. Lack of funds	20%
c. Opposition by local stakeholders	20%
d. Lack of enforcement capacity	20%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	20%
f. The recommendations are not Binding	20%
g. Other	0%
N/A	0%

a. Lack of legal instruments	0%
b. Lack of funds	0%
c. Opposition by local stakeholders	0%
d. Lack of enforcement capacity	0%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	0%
f. The recommendations are not Binding	0%
g. Other	0%
N/A	100%

a. Lack of legal instruments	6%
b. Lack of funds	17%
c. Opposition by local stakeholders	19%
d. Lack of enforcement capacity	19%
e. The implementation process is underway but slowly and therefore recommendations are expected to be implemented soon	14%
f. The recommendations are not BGnding	17%
g. Other	3%
N/A	6%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	18%
b. Allocate funds	18%
c. Engage local stakeholders	18%
d. Improve enforcement capacity	29%
e. Other	12%
N/A	6%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	14%
b. Allocate funds	21%
c. Engage local stakeholders	36%
d. Improve enforcement capacity	21%
e. Other	7%
N/A	0%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	0%
b. Allocate funds	0%
c. Engage local stakeholders	100%
d. Improve enforcement capacity	
e. Other	
N/A	0%

7. Which are the most promising solutions for solving the present situation and close the case files of the Bern Convention?	
a. Issue new regulations	16%
b. Allocate funds	19%
c. Engage local stakeholders	25%
d. Improve enforcement capacity	28%
e. Other	9%
N/A	3%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	21%
b. Coastal programme	11%
c. Land use plan	21%
d. Project	16%
e. Management Plan	16%
f. Other	0%
N/A	16%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	22%
b. Coastal programme	0%
c. Land use plan	0%
d. Project	22%
	44%
e. Other	0%
N/A	11%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	0%
b. Coastal programme	0%
c. Land use plan	0%
d. Project	0%
	0%
e. Other	0%
N/A	100%

9. What are the coastal management/development programmes, plans and/or projects that exist in area in question? (multiple answers possible)	
a. Coastal plan	21%
b. Coastal programme	7%
c. Land use plan	14%
d. Project	17%
	24%
e. Other	0%
N/A	17%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	50%
b. No	13%
N/A	38%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	83%
b. No	0%
N/A	17%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	100%
b. No	0%
N/A	0%

10. If the above planning initiatives exist, do they envisage the co-existence between the marine turtles and human activities?	
a. Yes	67%
b. No	7%
N/A	27%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	50%
b. Yes, in the process of adoption	0%
c. No	25%
N/A	25%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	50%
b. Yes, in the process of adoption	0%
c. No	17%
N/A	33%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	100%
b. Yes, in the process of adoption	0%
c. No	0%
N/A	0%

12. Are there any marine spatial plans developed/adopted that take in consideration the marine turtles ecosystem boundaries?	
a. Yes, adopted	53%
b. Yes, in the process of adoption	0%
c. No	20%
N/A	27%

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?

13. If the marine spatial plans exist do they provide protection of their routes in the marine space?

a. Yes	25%
b. No	13%
N/A	63%

a. Yes	50%
b. No	0%
N/A	50%

a. Yes	100%
b. No	0%
N/A	0%

a. Yes	40%
b. No	7%
N/A	53%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	50%
b. No	13%
N/A	38%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	33%
b. No	33%
N/A	33%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	0%
b. No	100%
N/A	0%

15. If tourism is the main activity endangering the marine turtles' natural habitats and their existence, have there been initiatives to propose alternative development pathways for local population?	
a. Yes	40%
b. No	27%
N/A	33%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' haBGtat	38%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	25%
c. There is no protected area defined.	0%
d. Other	13%
N/A	25%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' habitat	50%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	33%
c. There is no protected area defined.	0%
d. Other	0%
N/A	17%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' habitat	0%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	0%
c. There is no protected area defined.	0%
d. Other	0%
N/A	100%

17. If management plans for the protection of marine turtles exist, what is the planning boundary?	
a. The protected area boundary is strictly confined to the marine turtles' habitat	40%
b. The protected area is considered within a wider spatial context, taking in consideration influences from and linkages with the wider area?	27%
c. There is no protected area defined.	0%
d. Other	7%
N/A	27%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Fethiye)	
a. Yes, 100 metres	25%
b. Yes, more than hundred metres	13%
c. Yes, less than hundred metres	0%
d. No setback	25%
N/A	38%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Fethiye)	
a. Yes, 100 metres	17%
b. Yes, more than hundred metres	17%
c. Yes, less than hundred metres	33%
d. No setback	0%
N/A	33%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Fethiye)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	0%
d. No setback	100%
N/A	0%

18a. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Fethiye)	
a. Yes, 100 metres	20%
b. Yes, more than hundred metres	13%
c. Yes, less than hundred metres	13%
d. No setback	20%
N/A	33%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Patara)	
a. Yes, 100 metres	25%
b. Yes, more than hundred metres	63%
c. Yes, less than hundred metres	0%
d. No setback	13%
N/A	0%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Patara)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	83%
c. Yes, less than hundred metres	17%
d. No setback	0%
N/A	0%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Patara)	
a. Yes, 100 metres	0%
b. Yes, more than hundred metres	0%
c. Yes, less than hundred metres	100%
d. No setback	0%
N/A	0%

18b. Mediterranean ICZM Protocol under the Barcelona Convention stipulates 100 meters setback inland from the coastline. Has the setback zone been defined by law in the area in question? (Patara)	
a. Yes, 100 metres	13%
b. Yes, more than hundred metres	67%
c. Yes, less than hundred metres	13%
d. No setback	7%
N/A	0%

QUESTIONS TO THE KEY STAKEHOLDERS IDENTIFIED BY THE PREVIOUS STEP

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	86%
b. No	14%
N/A	0%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

1. Do you consider as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	93%
b. No	7%
N/A	0%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	63%
b. No	25%
N/A	13%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	83%
b. No	17%
N/A	0%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	100%
b. No	0%
N/A	0%

2. Do you think that the majority of your local community considers as important that sea turtles continue to occur in your country/area in the long-term future?	
a. Yes	73%
b. No	20%
N/A	7%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	13%
b. Stable	63%
c. Increasing	13%
N/A	13%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

3. With the present level of protection, what will be the long-term fate of sea turtles in country?	
a. Declining	7%
b. Stable	33%
c. Increasing	53%
N/A	7%

4a. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Fethiye)

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Fethiye)

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Fethiye)

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Fethiye)

a. Declining	38%
b. Stable	25%
c. Increasing	13%
N/A	25%

a. Declining	0%
b. Stable	17%
c. Increasing	83%
N/A	0%

a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

a. Declining	20%
b. Stable	20%
c. Increasing	47%
N/A	13%

4b. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Patara)	
a. Declining	14%
b. Stable	57%
c. Increasing	14%
N/A	14%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Patara)	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Patara)	
a. Declining	0%
b. Stable	0%
c. Increasing	100%
N/A	0%

4. With the present level of protection, what will be the long-term fate of sea turtles in each of the sites interested by the Bern Convention recommendations? (Patara)	
a. Declining	7%
b. Stable	29%
c. Increasing	57%
N/A	7%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	88%
b. Adequate	0%
c. Excessive	13%
N/A	0%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	100%
b. Adequate	0%
c. Excessive	0%
N/A	0%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	100%
b. Adequate	0%
c. Excessive	0%
N/A	0%

5. What is the current protection level assured to sea turtles in the country?	
a. Insufficient	93%
b. Adequate	0%
c. Excessive	7%
N/A	0%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	88%
b. No	0%
N/A	13%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	100%
b. No	0%
N/A	0%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	100%
b. No	0%
N/A	0%

6. Do you think that coexistence of people and sea turtle is possible, with both thriving?	
a. Yes	93%
b. No	0%
N/A	7%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	17%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	0%

7. What is the relation between sea turtle and economic development/income at local level?	
a. No relation	7%

b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	88%
N/A	13%

b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	83%
N/A	0%

b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	100%
N/A	0%

b. Turtles impede economic development / decrease profit	0%
c. Turtles favour economic development / increase profit	87%
N/A	7%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	26%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	11%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	11%
d. Pollution	16%
e. Fishing	26%
f. Other	5%
g. There is no threat	0%
N/A	5%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	14%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	14%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	21%
d. Pollution	21%
e. Fishing	0%
f. Other	21%
g. There is no threat	7%
N/A	0%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting habitat (sandy beach) that becomes unavailable to turtles	0%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	0%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	0%
d. Pollution	50%
e. Fishing	50%
f. Other	0%
g. There is no threat	0%
N/A	0%

8. Which are the main factors that threaten sea turtle future occurrence in your country/area (if any)?	
a. Destruction of nesting haBGtat (sandy beach) that becomes unavailable to turtles	20%
b. Human utilization (including vehicles) and presence on the nesting beach (that scares nesting females and/or damage the nests during incubation)	11%
c. Human presence and light pollution at night (that disorient hatchlings in their route to the sea)	14%
d. Pollution	20%
e. Fishing	17%
f. Other	11%
g. There is no threat	3%
N/A	3%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	24%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	33%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	0%

9. What should be done to ensure the long-term occurrence of sea turtles in your country/area?	
a. Public AUareness towards tourists	27%

b. Raising public AUareness of the local community	19%
c. New regulations to reduce the impact of threats	10%
d. Enforcement of existing regulations to reduce the impact of threats	33%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	10%
f. Nothing (there is no problem)	0%
N/A	5%

b. Raising public AUareness of the local community	27%
c. New regulations to reduce the impact of threats	7%
d. Enforcement of existing regulations to reduce the impact of threats	27%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	7%
f. Nothing (there is no problem)	0%
N/A	0%

b. Raising public AUareness of the local community	0%
c. New regulations to reduce the impact of threats	0%
d. Enforcement of existing regulations to reduce the impact of threats	100%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	0%
f. Nothing (there is no problem)	0%
N/A	0%

b. Raising public AUareness of the local community	22%
c. New regulations to reduce the impact of threats	8%
d. Enforcement of existing regulations to reduce the impact of threats	32%
e. Develop an action plan different from the current one (including Bern Convention recommendations)	8%
f. Nothing (there is no problem)	0%
N/A	3%

ANNEX III: Example of Monitoring form

(one form for each site sector).

Nesting site name				
Sector name				
Sector length (m)				
Turtle species				
		Year 0 (Ref)	Year 1	Year 2
C	Number of clutches			
E	Number of female emergences			
Anthropogenic threats				
HC	% coastline with contructions			
	Distance to sandy beach (m)			
	Types of constructions			
HD	Daily visitors (N)			
	Visitors density (N/m)			
OD	Ostacle density (N/m)			
	% coastline with obstacles			
LP	Number of lights (N)			
	Sky glow (Y/N)			
	Light intensity (lx)			
Beach features				
BW	Beach width (m)			
SC	Sand colour (brighter, stable, darker)			
BP	Elevation (lower, stable, higher)			
Proxy biological indicators				
NS	Clutches/nesting emergences			
HS	% eggs hatched			
ES	% eggs emerged			
OI	Fan spread (°)			
	Offset angle (°)			
	N clutches sampled (N)			
IP	Incubation period (days)			
	N clutches sampled (N)			
PC	% Clutches predated by pred 1			
	% Clutches predated by pred 2			
	% Clutches predated by pred 3			
	% Clutches predated by pred 4			
PH	% hatchlings predated on the beach			
	N clutches sampled (N)			
Mitigating measures				
CP	% Clutches protected			
RE	% Clutches relocated			
AE	% Clutches with assisted emergence			
CE	% positive attitude			
	N interviewed			

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