

Marine Turtles

1.1 Introduction

This report aims at fulfilling the requirements of the EU Marine Strategy Framework Directive (MSFD) in terms of Article 8 (1) and associated Annex III, in describing the population and assessing the status of marine turtles occurring in Malta based on existing data to date.

The current availability of data with respect to marine turtles is limited, with the majority of available information originating from reported or published sightings and strandings. Furthermore, the majority of these reports pertain to inshore waters, with very limited and sporadic reports from offshore areas. This data scenario limits the extent to which marine turtle populations can be assessed, both in terms of spatial distribution in marine waters, including migratory routes and/or presence of aggregation areas, and in terms of the criteria and indicators stipulated by the MSFD Commission Decision 2010/477/EU.

For the purpose of this report, data generated through sightings and stranding notifications by government institutions, the general public and Non-Governmental Organisations was collated. This data was supplemented by scientific data from published literature (when available) in an attempt to provide a wider overview of current knowledge on the local marine turtle population to the extent possible. Whilst trying to focus on the local situation, the description and assessment of the marine turtle populations was made within the regional and/or sub-regional context.

1.1.1 General Description

The presence of marine turtles off the Maltese Islands was probably first reported by Gulia (1890)¹. Gulia was the first naturalist to report not only the presence but also nesting of the loggerhead turtle in the Maltese Islands.

Five marine turtle species are reported from Malta^{2,3,4}:

- *Caretta caretta* - Loggerhead Turtle
- *Dermochelys coriacea* - Leatherback Turtle

¹ Gulia G., 1890. Erepetologia Maltesae. *Il Naturalista Maltese*. Anno 1 No 2

² Gramentz D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol 1. Nos 4, 1989.

³ Groombridge. B. 1994. Marine Turtles in the Mediterranean: distribution, population status, conservation. Nature and Environmental Series no. 48. Council of Europe.

⁴ Mifsud, C.; Baldacchino, A.E.; Stevens, D.T., Borg, J. & Gruppetta, A. 2005c. Marine Turtles In Malta: Legal framework, Conservation efforts and a status update. In: *Second Mediterranean Conference on Marine Turtles: Book of Abstracts*, Turkey: Lebib Yalkin Yayimlari

- *Chelonia mydas* - Green Turtle,
- *Eretmochelys imbricata* – Hawksbill,
- *Lepidochelys kempii* - Kemp’s Ridley

Chelonia mydas, *Lepidochelys kempii* and *Eretmochelys imbricata* are known from single records^{5,6}, while *Dermochelys coriacea*, which has been recorded on several occasions particularly between the 1970s and 1980s^{7,8}, is not considered a Mediterranean species⁹. In the Mediterranean this species is represented by a few large juvenile and/or adults that enter the Mediterranean accidentally during their southward migration in the Atlantic.

Caretta caretta and *Chelonia mydas* are the only species which nest in the Mediterranean. There are no records of breeding of the other species within this region¹⁰.

Out of the five recorded species, *Caretta caretta* is considered the most ‘abundant’ species and it is the only species of marine turtles which is regarded as a true member of the Maltese fauna, hence representative of the marine turtle species group in Malta. Consequently, this report will focus on the loggerhead turtle, *Caretta caretta*, while providing a brief description of records of the other turtle species.

1.2 Relevant Legislation and/or Management Activities

Malta is committed to the conservation of marine turtles both nationally and internationally. This section outlines the main legislative tools or policies which include provisions targeted at protecting and/or conserving marine turtles and their habitats, and are thus of relevance to the implementation of the MSFD with regards to marine turtles.

For completeness, Table 1 provides a list of International treaties deemed relevant to the MSFD Initial Assessment on marine turtles, including an indication of Malta’s status in relation to such treaties. The treaties are listed in chronological order by date of accession (ratification or accession) by Malta.

⁵ Brongersma L.D. & Carr. A.F. 1983. *Lepidochelys kempii* (Garman) from Malta, *Proceedings Koninklijke Nederlandse Akademie van Wetenschappen*, series C, **86**(4): 445-454

⁶ Gramentz D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol **1**. Nos 4, 1989

⁷ Lanfranco G. 1983. Landings of *Dermochelys coriacea* Linn [Reptilia, Dermochelidae] in Malta [Central Mediterranean]. *The Central Mediterranean Naturalist*, Vol. **1** (2) 1983.

⁸ Gramentz D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol **1**. Nos 4, 1989.

⁹ Gramentz D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol **1**. Nos 4, 1989.

¹⁰ Casale, P., Nicolosi, P., Freggi, D., Turchetto, M. & Argano, R. 2003. Leatherback turtles (*Dermochelys coriacea*) in Italy and in the Mediterranean basin. *Herpetological Journal* **13**, 135–139.

1.2.1 EU legislation

EU Habitats Directive (92/43/EEC)

The Habitats Directive is the main European legislation targeting the conservation and protection of species of community interest listed in its annexes¹¹. It is also the main European legal framework for designating protected areas of European importance in the marine environment.

Marine turtles, including the 5 species recorded in Malta, are listed in Annex IV of the Directive as strictly protected species, which protection should also cover their derivatives and habitats within all EU Member States. Member states need to take all the requisite measures to maintain the population of these species at a Favourable Conservation Status (FCS).

The green turtle (*Chelonia mydas*) and the loggerhead turtle (*Caretta caretta*) are also included in Annex II of this Directive, listing species whose conservation requires the designation of Special Areas of Conservation (SACs), forming part of the Natura 2000 European Network of protected sites. Furthermore, these two species are listed as 'priority species'.

Malta transposed the Habitats Directive (92/43/EEC) into local legislation through Legal Notice 311 of 2006 (as amended).

The EU Biodiversity Strategy 2020, aims at ensuring the successful implementation of the Habitats Directive and calls for the fulfilment of this Directive with a view to halt deterioration of the status of all species and habitats covered by the EU Nature legislation and to achieve a significant improvement of their status by 2020.

Council Regulation (EC) 1967 of 2006, concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea

Council Regulation (EC) 1967 of 2006¹² calls for a sustainable exploitation of fishery resources in the Mediterranean Sea. Article 3 of this regulation cross refers to the Habitats Directive (92/43/EEC) and prohibits deliberate catching, retention on board, transshipment or landing of protected species listed in Annex IV of the Habitats Directive.

¹¹ Strictly protected species are listed in annex IV, whilst annex V list those species whose exploitation and taking from the wild may be subject to management measures

¹² Council Regulation (EC) No 1967/2006 of 21 December 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 1626/94

However fishermen may be authorised to land such turtles subject to the provision that the retention on board, transshipment or landing of incidentally caught specimens is necessary to secure assistance for the recovery of the individual animals, and provided that the competent national authorities concerned have been duly informed in advance.

1.2.2 Regional conventions and/or other international agreements.

Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is a United Nations Environment Programme (UNEP) administered multilateral environment agreement targeted at the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from the utilisation of genetic resources. The Convention calls on contracting parties to conserve biological diversity by establishing a system of protected areas or areas subject to special management measures targeted at the management of biological resources, protection of ecosystems, maintenance of viable populations of species and recovery of threatened species.

The CBD has also recently called for the identification of ecologically or biologically significant areas (EBSAs) in marine areas beyond national jurisdiction, based on scientific criteria as contained in Annex I to CBD Decision IX/20.

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)

The Council of Europe's Bern Convention, which covers most of the natural heritage of the European continent and extends to some States in Africa, aims at the conservation of European wild flora and fauna and their natural habitats, with a particular focus on the protection of endangered natural habitats and species, including migratory species, while promoting European co-operation in this field. The European Community is also a Contracting Party to the Bern Convention.

The marine turtle species recorded in the Mediterranean are listed in Appendix II of the Bern Convention. Similar provisions as per the EU Habitats Directive apply, also in terms of a network of protected areas which in the case of the Bern convention is called the Emerald Network. The latter is made up of 'Areas of Special Conservation Interest' (ASCIs).

The Convention on Migratory Species – CMS- The Bonn Convention

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) aims to conserve terrestrial, aquatic and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the auspices of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale.

Migratory species threatened with extinction throughout all or a significant proportion of their range, are listed in Appendix I of the Convention. Parties should strive towards strictly protecting these species, conserving or restoring areas where they thrive, mitigating obstacles to migration and controlling other factors that might endanger them.

Migratory species with an unfavourable conservation status that need or would significantly benefit from international co-operation organised by tailored agreements are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional Agreements.

Marine turtles, including the 5 species recorded in Malta, are included in Appendix I and II of the convention, but are not currently covered by regional agreements.

The Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention) and the Protocol for Specially Protected Areas and Biodiversity in the Mediterranean (SPA & Biodiversity Protocol)

Malta, as all the Mediterranean countries, is Party to the Barcelona Convention and to the Protocol concerning Specially Protected Areas and Biological Diversity (SPA and Biodiversity protocol) in the Mediterranean (Barcelona, 1995). Amongst other matters, the Barcelona Convention targets the protection of Mediterranean marine turtles (Genoa Declaration, September 1985). Turtles recorded in the Mediterranean Sea are listed as endangered or threatened species in Annex II of the SPA and Biodiversity protocol. Parties to this protocol are also obliged to establish protected areas [SPAs - Specially Protected Areas and SPAMIs - Specially Protected Areas of Mediterranean Importance] and to undertake actions to protect and where possible restore. SPAMIs can be designated in high seas and between parties, hence the importance of such protected areas to migratory species utilising foraging /migratory routes in offshore areas.

The Regional Centre for Specially Protected Areas or RAC/SPA, has issued a series of action plans targeted at the implementation of the SPA and Biodiversity Protocol including the 'Action Plan for the Conservation of Mediterranean Marine Turtles'. Although these action plans are not legally binding they set priorities and activities to be undertaken by the contracting parties. These action plans call for co-ordination of efforts between states of the region to ensure conservation and sustainable management of the concerned species in

their area of distribution within the Mediterranean. Apart from these Action plans, the centre also issued guidelines and other relevant information to the parties including 'Guidelines to Design Legislation and Regulation Relative to the Conservation and Management of Marine Turtle Populations and their Habitats, 2003' and the 'Guidelines to Improve the Involvement of Marine Rescue Centres for Marine Turtles, 2004'.

The Convention on International Trade in Endangered Species of Wild of Flora and Fauna- [CITES]

CITES - the Convention on International Trade in Endangered Species, is an international agreement aiming at the preventing international trade from threatening the survival of wild animals and plants, through international co-operation. Levels of exploitation of some animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction.

The Convention establishes an international legal framework setting common procedural mechanisms to be applied by the Contracting Parties. The European Union however, through the issue of Council Regulation 338 of 1997, has established stricter rules. CITES affords varying degrees of protection to more than 30,000 species of animals and plants, whether they are traded as live specimens or their derivatives.

Marine turtles are listed in Appendix 1 of this convention (annex A of the EU Council Regulation) and hence are strictly protected.

Table 1: International treaties deemed relevant to the MSFD Initial Assessment on marine turtles, including an indication of Malta's status in relation to such treaties. The treaties are listed in chronological order by date of adhesion (ratification or accession) by Malta.

Treaty	Entered in force	Adhesion by Malta	Status
Convention for the Protection of the Mediterranean Sea against Pollution [Barcelona Convention]	16 February 1976	30 December 1977	Ratification
Convention concerning the Protection of the World Cultural and Natural Heritage [World Heritage Convention]	17 December 1975	14 November 1978	Accession
Protocol concerning Mediterranean Specially Protected Areas [SPA Protocol]	23 March 1986	11 January 1988	Ratification
Convention on International Trade in Endangered Species of Wild of Flora and Fauna [CITES]	1 July 1975	17 April 1989	Accession
United Nations Convention on the Law of the Sea [UNCLOS]	16 November 1994	20 May 1993	Ratification
Convention on the Conservation of European Wildlife and Natural Habitats [Bern Convention]	1 June 1982	26 November 1993	Accession
Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean [SPA & Biodiversity Protocol]	12 December 1999	28 October 1999	Ratification
United Nations Convention on Biological Diversity [CBD]	29 December 1993	12 December 2000	Ratification
Convention on the Conservation of Migratory Species of Wild Animals [Bonn Convention]	3 November 1983	13 February 2001	Accession

1.2.3 Other legislation

The loggerhead turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*) and green turtle (*Chelonia mydas*) are protected through Legal Notice 76 of 1992 - the Reptiles (Protection) Regulations. In accordance with these regulations, no person shall pursue, take or attempt to take, kill or attempt to kill, possess, sell by any method, buy, exchange, import or export any species, or any part or derivative of such species, listed in the schedules of these regulations.

Amongst other provisions, these regulations stipulate that marine turtles accidentally caught by fishermen and landed at the fish market have to be surrendered immediately to the Director of Fisheries subject to compensation.

1.2.5 Other conservation initiatives

Recommendations by the General Fisheries Commission for the Mediterranean

The GFCM (General Fisheries Commission for the Mediterranean) adopted recommendations¹³ aimed at minimizing the adverse effects of fisheries operations on marine turtles. These recommendations call for Contracting Parties to ensure the implementation of fisheries management measures to mitigate or eliminate the risk of incidental taking of sea turtles in fishing operations and/or the mortality associated with those incidental takings. These recommendations also call for monitoring and recording of data in relation to incidental taking as well as for advice and guidance from the Scientific Advisory Committee with respect to mitigation measures.

The GFCM Recommendations specify that purse seine vessels should avoid encircling sea turtles and release encircled or incidentally entangled sea turtles, including on Fish Aggregating Devices. According to the GFCM recommendation, pelagic longline vessels should carry on board safe handling, disentanglement and release equipment, capable of releasing sea turtles unharmed and in a manner that maximises the probability of their survival.

The EU Life + Project Migrate (LIFE11 NAT/MT/1070)

This project is currently ongoing and is expected to be completed in 2016. The project focuses on the loggerhead turtle and the bottlenose dolphin, which although are considered to be flagship species, their populations in Malta and areas that may be essential to them are as yet unknown. Studies in this regard will be carried out as part of Life+ Migrate with a view to assess the status of these species' population in Malta.

¹³ GFCM Recommendations 35/2011/7 and 35/2011/4

1.3 Loggerhead Turtle - *Caretta caretta*

1.3.1 Distributional Range: Nesting

Records of nesting *Caretta caretta* on the Maltese Islands were not infrequent in the past. According to Despott (1915)¹⁴, nesting was known to occur on unfrequented beaches, suggesting that such nesting was probably minor and irregular¹⁵. Nesting sites were however abandoned in the period between 1910-1940 mainly due to development of coastal areas and anthropogenic disturbance, particularly from the tourism and recreational sectors¹⁶. Prior to a recent nesting event in 2012, the last officially recorded nesting of *Caretta caretta* occurred in the early 1940's, in an unknown location¹⁷.

Nevertheless, there are a number of unconfirmed statements made by locals indicating the possibility of irregular nesting of this species after the 1940s. Localities in question are indicated in Figure 1.

Deidun & Schembri (2005)¹⁸ describe an encounter with a local who reported nesting at Ir-Ramla tal-Mixquqa (North-West Malta) in 1960. This occurred at a time when the beach was still dark in the evenings and generator light was only used when necessary. There were also some other unverified statements by fishermen of possible nesting in Għajn Tuffieħa (Mr. Darrin Stevens, personal communication). Some local fisherman have recounted that they used to capture specimens (prior to their legal protection) while nesting at Santa Marija in Comino (Mr. Darrin Stevens, personal communication).

Bonett, 1982¹⁹ makes reference to Ramla l-Ħamra in Gozo as a past nesting site for *Caretta caretta* on the basis of Despott (1930a)²⁰ and Gulia (1890)²¹. Gramentz (1989)²² also postulates that this represents a former rookery. However, the authenticity of this record is doubtful, since this beach has never been historically reported as a nesting site. Gulia (1890)²³ only makes a general reference to 'nesting on sandy beaches' whilst Despott (1915)²⁴ refers to 'unfrequented sandy beaches especially in Gozo'.

¹⁴ Despott G. 1915. The Reptiles of the Maltese Islands . The Zoologist. Ser 4 19 (891).

¹⁵ Groombridge, B., 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. Nature and Environmental Series no. 48. Council of Europe.

¹⁶ Lanfranco G., & Schembri PJ1989 Vertebrates other than Birds –Red Data Book for the Maltese Islands Ed: P. J. Schembri and J Sultana, Department of Environment Division Ministry of Education, Beltissebħ, Malta, Published by Department of Information.

¹⁷ Groombridge, B., 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. Nature and Environmental Series no. 48. Council of Europe.

¹⁸ Deidun, A. & Schembri, P.J., 2005. A report of nesting on a Maltese beach by the loggerhead turtle *Caretta caretta* (Linnaeus, 1758) (*Reptilia: Cheloniidae*). *The Central Mediterranean Naturalist* Volume 4 (Part 2): 137-138.

¹⁹ Bonett, G. 1982. Loggerhead turtles in Maltese waters. *Potamon* 9:107-109.

²⁰ Despott, G. 1930a. Herpetological note. *Bulletin of the Museum*, 1(11): 80-82.

²¹ Gulia, G., 1890. *Erepetologia Maltesae* II *Naturalista Maltese*. Anno 1 No 2

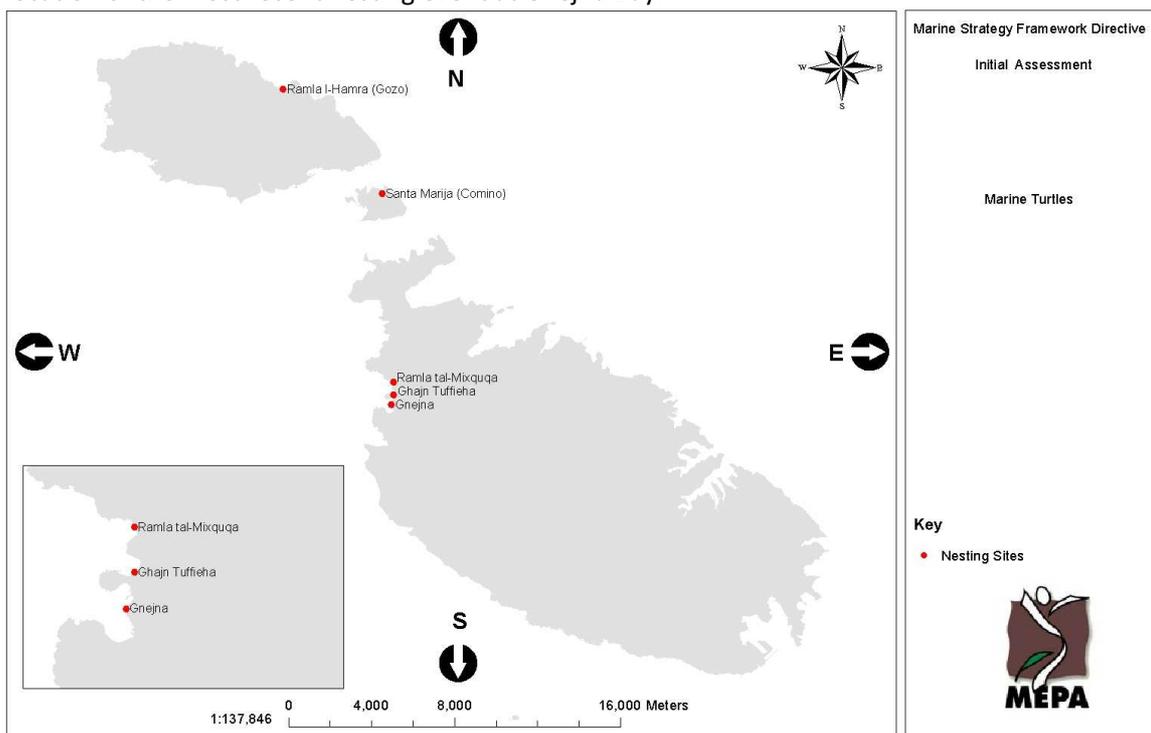
²² Gramentz, D. 1989. *Marine Turtles in the Central Med Sea*. *Centro*, Vol 1. Nos 4, 1989.

²³ Gulia G., 1890. *Erepetologia Maltese* II *Naturalista Maltese*. Anno 1 No 2

²⁴ Despott G. 1915. The Reptiles of the Maltese Islands . The Zoologist. Ser 4 19 (891).

In June 2012, a loggerhead turtle nested at Ġnejna Bay (Southwestern coast of Malta) after nearly a century from the last officially recorded nesting. The eggs were laid in the vicinity of the waterline and thus needed to be relocated. The relocation process provided the opportunity to determine the number of eggs laid, which amounted to a total of 79 eggs. On September 7th 2012, 79 days after the laying of the eggs without any hatching, the eggs were excavated and analysed. Results showed that the embryos had died at different developmental stages. The embryos within the upper layer of eggs died at the very last stages, about 1-3 days before hatching (Ms. Carmen Mifsud, personal communication). The death of the embryos was probably due to the amount of clay material in the sand which inhibited normal gas exchange in the nest in this area. This nesting event is considered to be a one-off event, same as in the past nesting in Malta was always considered as sporadic. However the occurrence of this event implies that future nesting events cannot be completely excluded from Maltese beaches. Nesting occurs regularly in nearby islands Sicily and Lampedusa.

Figure 1: Location of historic and past unconfirmed nesting sites of *Caretta caretta*, including location of the most recent nesting event at Ġnejna Bay.



1.3.2 Distributional Range (marine waters) & Population Abundance

Loggerhead turtles occur throughout the entire Mediterranean marine region²⁵. The highest density however appears to occur in the westernmost part of this basin, (from the Alboran Sea to the Balearic Islands), mostly due to the high influx of turtles incoming from the Atlantic^{26,27}, the Strait of Sicily, the Ionian Sea, the North Adriatic, off Tunisia-Libya, Egypt and off Southeast coast of Turkey²⁸.

The 'Maltese population' does not seem to be influenced by the Atlantic contingent and the waters seem to be inhabited solely by individuals of Mediterranean origin with a major contribution from the nearest and largest loggerhead colonies²⁹.

Reports of *Caretta caretta* in Malta are relatively regular^{30,31}. Strandings, incidental captures and sighting notifications indicate that this species occurs all year round in Malta, with highest numbers generally reported between June and September. This period coincides with the maximum fishing activity for swordfish, tuna and dolphin fish^{32,33}, hence the high numbers reported could be attributed to the fact that most of the information available is based on incidental captures. Balzan in Groombridge (1994)³⁴ also makes reference that loggerhead turtles 'are not infrequently observed basking at the surface or beneath palm leaves used for fishing floats'. This basking behaviour is confirmed through

²⁵ Casale P. & Margaritoulis D. (Eds.) 2010. *Sea Turtles in the Mediterranean: Distribution, Threats and Conservation Priorities*. IUCN/SSC Marine Turtle Specialist Group. Gland, Switzerland: IUCN, 294 pp. <http://iucn-mtsg.org/publications/med-report/>

²⁶ Laurent L.; Bradai M.N.; Godley, B.J.; Gerosa G.; Broderick A.C.; Schroth W.; Schierwater B.; Levy AM.; Freggi D.; Abd El-Mawla E.M.; Hadoud D.A.; Gomati H.E.; Domingo M.; Hadjichristophorou M.; Kornaraky L.; Demirayak F. & Gautier C.H., 1998. Molecular resolution of marine turtle stock composition in fishery bycatch: a case study in the Mediterranean. *Mol. Ecol.*, **7**: 1529-1542.

²⁷ Individuals from the Atlantic contingent do not seem to venture further than the Strait of Sicily.

²⁸ Casale P. & Margaritoulis D. (Eds.) 2010. *Sea Turtles in the Mediterranean: Distribution, Threats and Conservation Priorities*. IUCN/SSC Marine Turtle Specialist Group. Gland, Switzerland: IUCN, 294 pp. <http://iucn-mtsg.org/publications/med-report/>

²⁹ Garofalo L., Mastrogiacomo A., Casale P., Carlini R., Eleni C., Freggi D., Gelli D., Knittweis L., Mingozzi T., Novarini N., Scaravelli D., Scillitani G., Oliverio M., & Novelletto A. 2013. Genetic characterization of central Mediterranean stocks of the loggerhead turtle (*Caretta caretta*) using mitochondrial and nuclear markers, and conservation implications. *Aquatic Conservation: Marine And Freshwater Ecosystems*- Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/aqc.2338

³⁰ Groombridge, B., 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. *Nature and Environmental Series no. 48*. Council of Europe

³¹ Bonett, G., 1982. Loggerhead turtles in Maltese waters. *Potamon, newsletter of the Society for the study and conservation of Nature*. No 392, 107-109.

³² Groombridge, B., 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. *Nature and Environmental Series no. 48*. Council of Europe

³³ Bonett, G., 1982. Loggerhead turtles in Maltese waters. *Potamon, newsletter of the Society for the study and conservation of Nature*. No 392, 107-109.

³⁴ Groombridge, B., 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. *Nature and Environmental Series no. 48*. Council of Europe.

verbal communication with sea-users who encounter relatively large aggregates of migrating turtles and /or basking on the sea surface during late Spring and Summer³⁵.

Data on *Caretta caretta* available to date mainly pertains to sightings and reports on strandings, incidental captures by fisheries or injured turtles, the latter generally collected for rehabilitation purposes. Data on strandings and injured turtles as collated by the Malta Environment and Planning Authority during the period 2006-2013 is mapped in

³⁵ Verbal communications from sea-users (Bonavia, personal communication .2010-data for September when traversing to Sicily by boat and data from NGO Nature Trust Malta (Personal communication) : 293 turtles in May 2013, seen basking & migrating)

Figure 2. A few 2013 sightings of live healthy turtles are also included in Figure 3. Published data on sightings and strandings of loggerhead turtles is reproduced in Table 2.

Figure 2: Data on strandings and injured turtles collated by the Malta Environment and Planning Authority during the period 2006-2013.

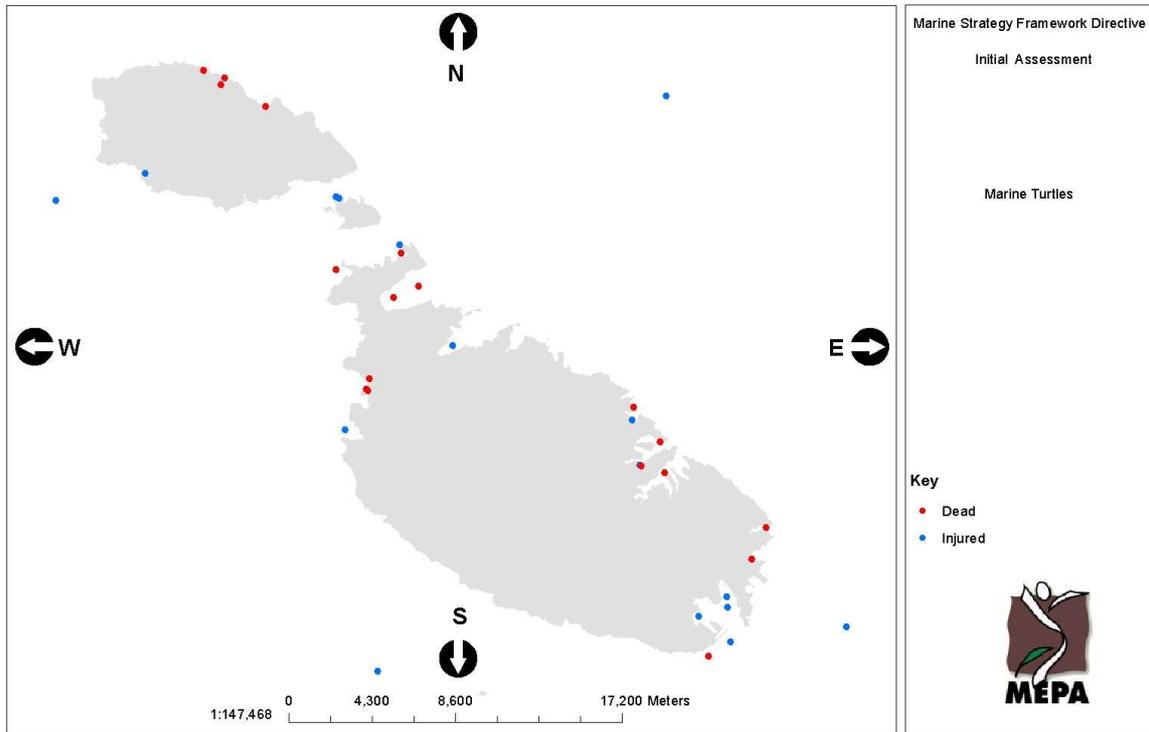


Figure 3: 2013 sightings of live marine turtles as reported to the Malta Environment and Planning Authority

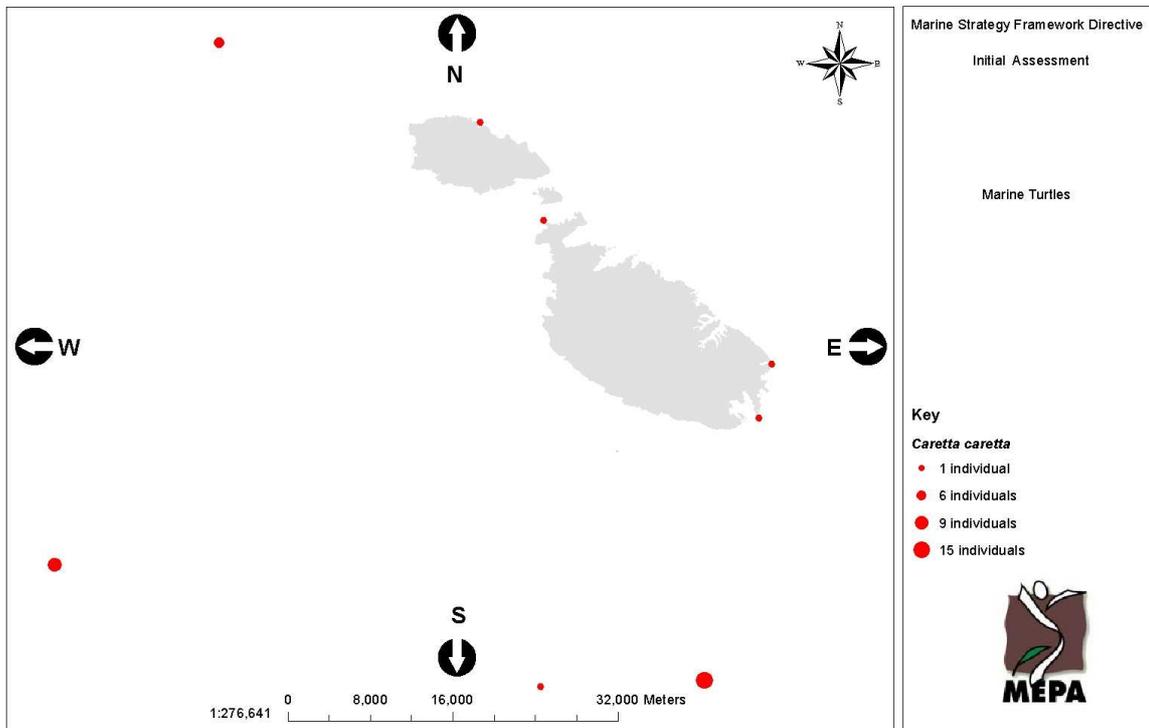


Table 2: Published data on sightings and strandings of loggerhead turtles³⁶. This data has not been plotted as spatial data in view of the lack of accurate indication of the location.

Date	Number of turtles sighted	Indication of location of sighting	State
January 1991	1	off Gozo	Injured
January 1997	1	Bugibba	Dead
July 1997	1	Għajn Żejtuna	Alive
October 1997	1	Ix-Xlendi	
July 1998	30	12 miles off Southeastern coast of mainland Malta	Alive
August 1998	25	24 miles off Southeastern coast of Malta	Alive
September 1998	1	20 miles off Southeastern coast of Malta	Alive
September 1998	1	18 miles off Southeastern coast of Malta	Alive
October 1998	4	8 miles off Southeastern coast of Malta	Alive
October 1998	8	11 miles off Southeastern coast of Malta	Alive
October 1998	8	15 miles off Southeastern coast of Malta	Alive
December 1998	1	No data	Alive
May 1999	1	Xlendi (Gozo)	Dead
July 1999	6	24 miles off Southeastern coast of Malta	Alive
August 1999	4	20 miles off Southeastern coast of Malta	Alive
August 1999	2	5 miles off Gnejna (to the Northwest)	Alive
October 1999	1	Gozo	Alive
September 2000	1	Off eastern Gozo	Alive
February 2001	1	Pieta	Alive
April 2001	1	Ix-Xemxija	Dead
May 2001	1	Sliema	Dead
May 2001	1	IC-Cirkezza	Alive
July 2001	1	Il-Gnejna	Alive
July 2001	1	Tas-Sliema	Alive
October 2001	1	Pembroke	Alive

³⁶ Baldacchino A. E. & Schembri P.J. 2002. Amfibiji, Rettili, u Mammiferi. Sensiela Kullana Kulturali- Pubblikazzjoni Indipendenza- PIN.

The main data sets on turtle sightings have been collected by BirdLife Malta in 2008 and 2012 as part of the EU LIFE Yelkouan Shearwater Project³⁷ and the EU LIFE+ Malta Seabird Project³⁸ respectively (**Error! Not a valid bookmark self-reference.** and Figure 5). Both data sets were collected systematically through observations from boat trips following specific transects perpendicular to the Maltese coast in accordance with the standard European Seabirds at Sea methodology (ESAS), a widely used census system for logging observations of seabirds and other marine animals. Whereas the EU LIFE Yelkouan Shearwater Project focused on the area within 7 nautical miles of the Maltese coastline, the EU LIFE+ Malta Seabird Project covered up to 25 nautical miles. While the available data is not deemed adequate enough to elucidate any trends or patterns in such distribution, the 2012 data implies that sightings of loggerhead turtles seem to be more common in areas off the northwestern to southeastern coast of the Maltese archipelago. Fishermen's speculation on the number of turtles sighted or incidentally captured indicates that the marine waters off Filfla and nearby areas (South-West/South Coast of Malta) may be important foraging/resting grounds/migration routes. However, this would need to be verified through scientific studies.

The data also implies a seasonal pattern of occurrence with a higher numbers of sightings in spring. However these patterns would need to be verified through long-term monitoring.

³⁷ <http://www.lifeshhearwaterproject.org.mt>

³⁸ <http://www.birdlifemalta.org/Content/LIFEPROJECTS/maltaseabirdproject/1115/>

Figure 4: Sightings of loggerhead turtles as collated by BirdLife Malta for 2008, as part of the EU LIFE Yelkouan Shearwater Project

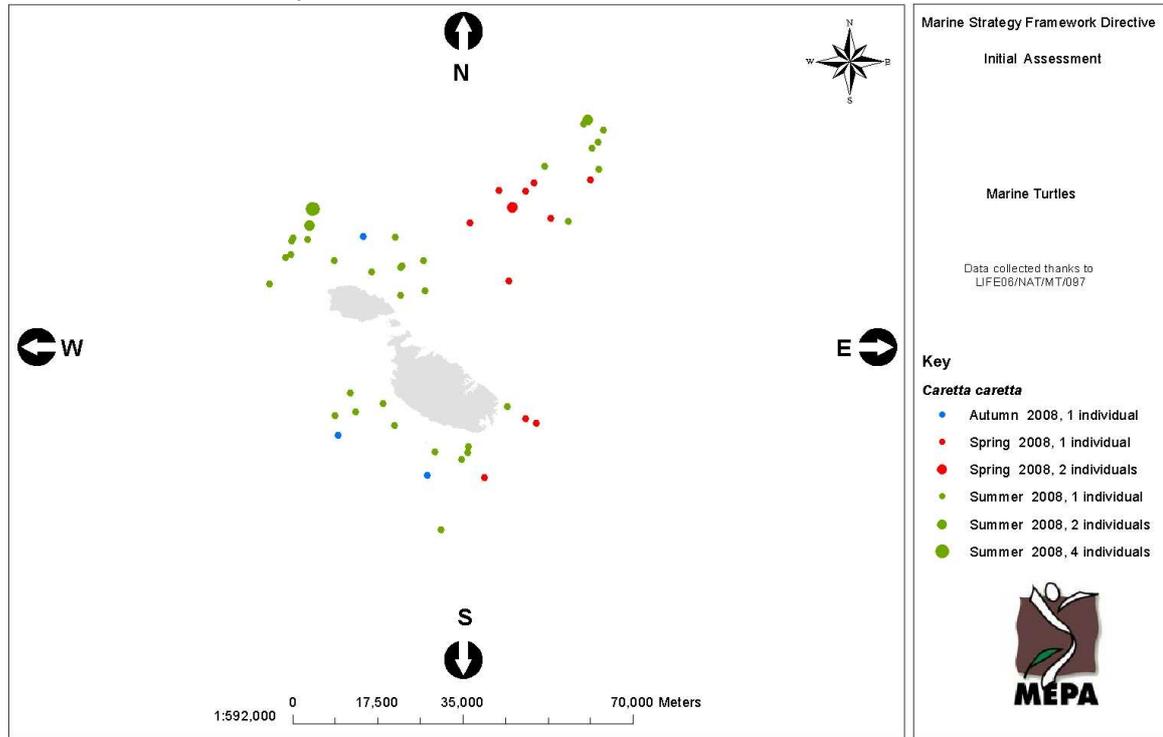
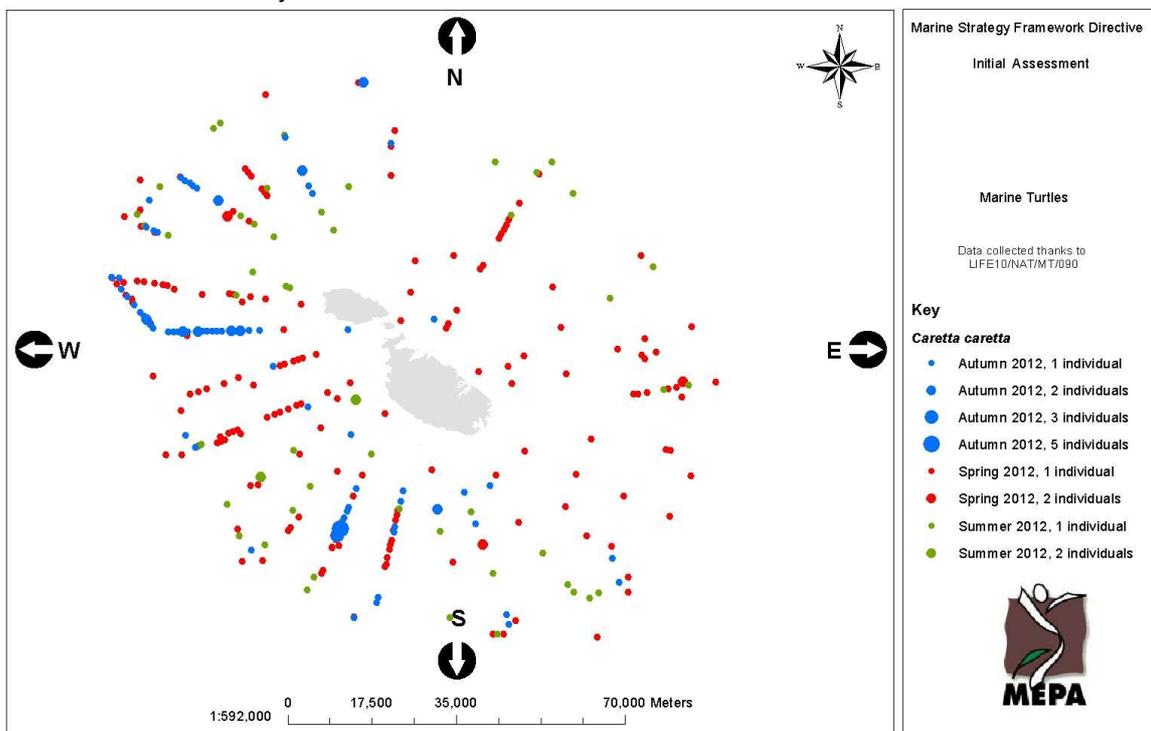


Figure 5: Sightings of loggerhead turtles as collated by BirdLife Malta for 2012 as part of the EU LIFE+ Malta Seabird Project .



Genetic studies carried out by Garofalo *et al.* (2013)³⁹ shed light on the migratory routes of *Caretta caretta* in the central Mediterranean area. Through this study, the stock composition at five central-Mediterranean foraging areas, including Malta, was investigated by analysing variation in the mitochondrial D-loop and six microsatellite loci in a sample of 268 loggerhead turtles (*Caretta caretta*) stranded or accidentally caught by fishers. In general, the results of the study indicate that the central Mediterranean area represents a crucial crossing of migration routes for Mediterranean turtles. Waters are mainly inhabited by individuals of Mediterranean origin, predominantly Turkish individuals and by juveniles from Mediterranean rookeries. Despite Malta's vicinity to Lampedusa, there does not seem to be any link between marine turtles from the two islands, possibly due to the deep waters separating them and the different currents to which they are subject.

In 2008, through the help of RAC/SPA and Istituto Zoologico di Napoli, the Malta Environment and Planning Authority, the Veterinary Resources and Fisheries Control and Conservation Division released 2 rehabilitated turtles with satellite tags. Their migration route can be followed on: http://www.seaturtle.org/tracking/index.shtml?project_id=358. The bigger turtle released, 'Zeus', had been incidentally caught by fishermen and spent several weeks in the rehabilitation centre. After being released with the satellite tag in July 2008, it stayed for a month in the Eastern Malta. It then ascended towards the southern Sicilian coast and continued swimming in the Sicilian Channel. The other one, 'Vicky', which had suffered severe head and neck injuries possibly from a fishing hook, and lost the left front flipper due to entanglement in a fishing line, had spent some years in the rehabilitation centre. Once released (also in July 2008) with the satellite tag, it swam to the coast of Sicily and after about 54 days reached the coast of Sardinia from where she swam straight to the Spanish coast. After one hundred days from its departure from Malta it reached the Algerian coast, where it remained in the neighbourhood.

³⁹ Garofalo L., Mastrogiacomo A., Casale P., Carlini R., Eleni C., Freggi D., Gelli D., Knittweis L., Mingozi T., Novarini N., Scaravelli D., Scillitani G., Oliverio M., & Novelletto A. 2013. Genetic characterization of central Mediterranean stocks of the loggerhead turtle (*Caretta caretta*) using mitochondrial and nuclear markers, and conservation implications. Aquatic Conservation: Marine And Freshwater Ecosystems- Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/aqc.2338

Population abundance data for *Caretta caretta* in Malta is lacking and determination of abundance by extrapolation from the number of nesting females is not possible for Malta due to the lack of regular nesting, which was probably sporadic, irregular and minor even in the past. According to Despott (1915) and other published information^{40,41,42,43,44,45,46} loggerhead turtles were common in Malta. Groombridge (1994)⁴⁷ stated that relatively large numbers of foraging loggerheads used to occur in Malta with highest numbers reported between June and September. Bonett (1982)⁴⁸ recounts that in his visits to the local fish market at Valletta he used to encounter many specimens, including a large number of adults or nearly adults.

Nowadays, a number of turtles are incidentally captured by fishermen (specifically through surface long-lining) or are stranded around the Maltese Islands. The number of turtle by-catch per fishing effort for the period 2008-2011 is indicated in Figure 6 and Figure 7. With the exception of peaks in turtle by-catch reported from September – November 2008, which peaks cannot be explained at this stage, the extent of turtle by-catch has been more or less constant throughout the recent years, implying that there has been no significant decline in the abundance of *Caretta caretta* in Malta, assuming that by-catch from the long-lining fishery is a reliable indicator of overall population abundance.

⁴⁰ Bonett, G., 1982. Loggerhead turtles in Maltese waters. *Potamon*, newsletter of the Society for the study and conservation of Nature. No 392, 107-109.

⁴¹ Gramentz, D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol 1. Nos 4, 1989.

⁴² Baldacchino A. E. & Schembri P.J. 2002. *Amfibji, Rettili, u Mammiferi. Sensiela Kullana Kulturali- Pubblikazzjoni Indipendenza- PIN.*

⁴³ Mifsud, C.; Baldacchino A.E.; Gruppetta, A. & Stevens, D.T. (2005a). Analysis of tagging and recovery of marine turtles in the Maltese Islands. In: *Second Mediterranean Conference on Marine Turtles: Book of Abstracts*, Turkey: Lebib Yalkin Yayimlari ve Basim İşleri Anonim Şirketi, pp. 31.

⁴⁴ Mifsud, C.; Baldacchino A.E.; Gruppetta, A. & Stevens, D.T. (2005b). Preliminary data on stranded and on landed accidentally caught loggerhead turtles in Malta. In: *Second Mediterranean Conference on Marine Turtles: Book of Abstracts*, Turkey: Lebib Yalkin Yayimlari ve Basim İşleri Anonim Şirketi, pp. 31.

⁴⁵ Mifsud, C.; Baldacchino A.E.; Stevens, D.T., Borg, J. & Gruppetta, A., (2005c). Marine Turtles In Malta: Legal framework, Conservation efforts and a status update. In: *Second Mediterranean Conference on Marine Turtles: Book of Abstracts*, Turkey: Lebib Yalkin Yayimlari ve Basim İşleri Anonim Şirketi, pp. 32.

⁴⁶ Mifsud C.; Baldacchino, A.E.; Gruppetta A. & Stevens, D.T. 2007. Status and Conservation of Marine Turtles in Malta. In: *26th Annual symposium on Sea turtles Biology and Conservation*, Crete, Greece 3-8 April, 2006, pp. 222

⁴⁷ Groombridge, B., 1994. *Marine Turtles in the Mediterranean: distribution population status, conservation*. Nature and Environmental Series no. 48. Council of Europe

⁴⁸ Bonett, G., 1982. Loggerhead turtles in Maltese waters. *Potamon*, newsletter of the Society for the study and conservation of Nature. No 392, 107-109.

Figure 6: Turtle by-catch per unit effort (per 1000 hooks per hour) of surface long liners targeting blue fin tuna and swordfish (2008 – 2010). Data is based on Fishers' reports.

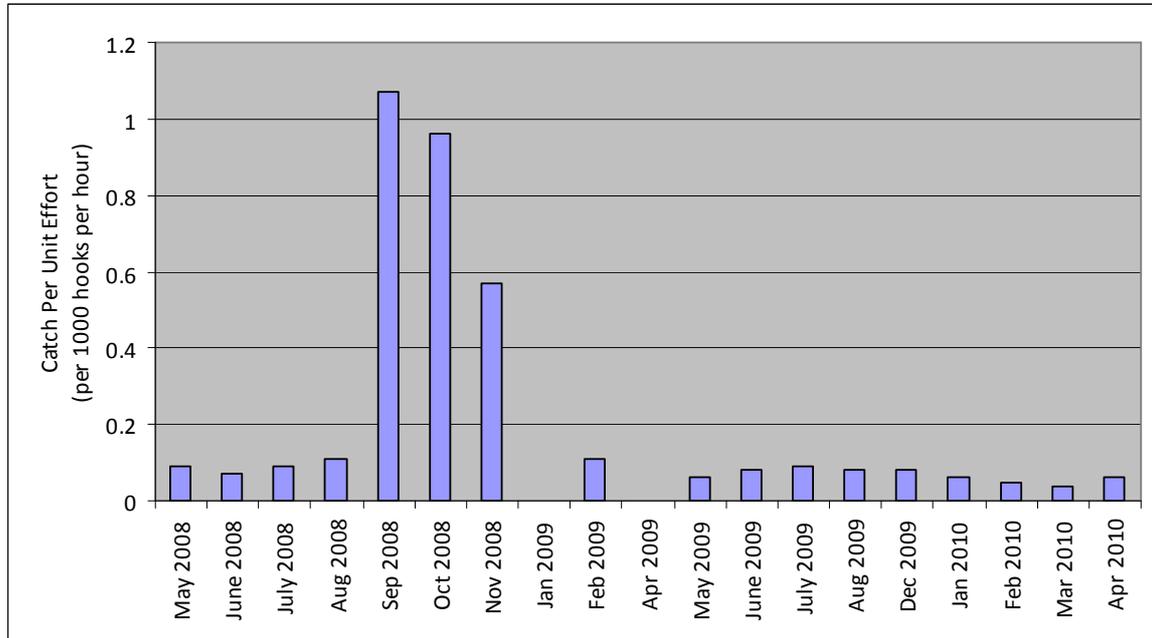
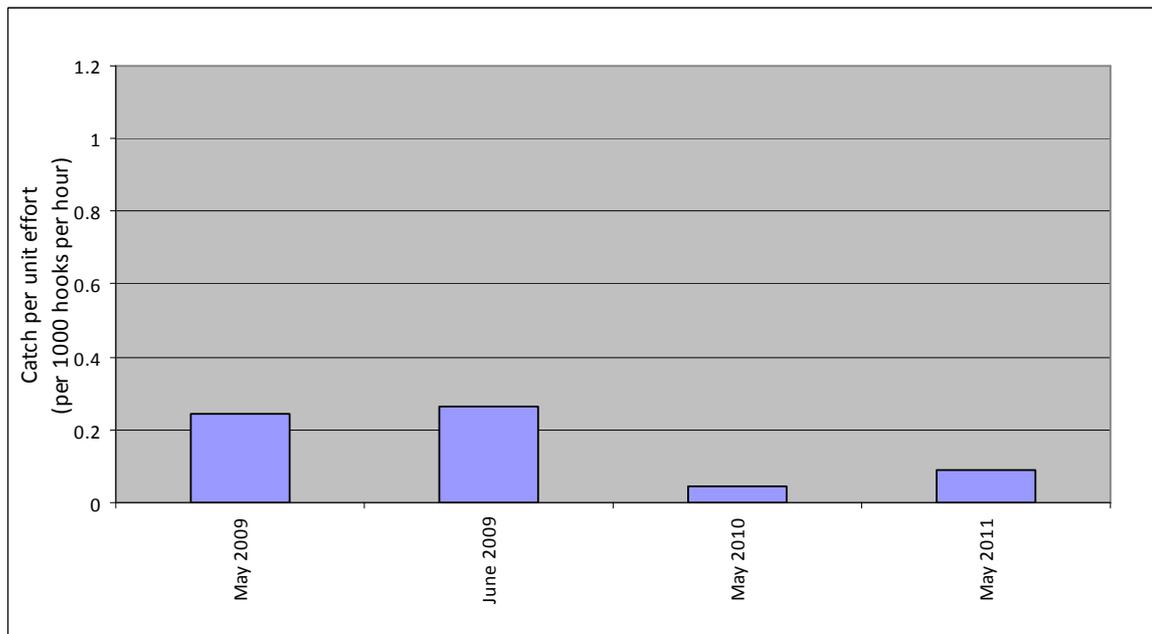


Figure 7: Turtle by-catch per unit effort (per 1000 hooks per hour) of surface long-lining from onboard observations carried out by Fisheries officers in the period 2009-2011



1.3.3 Population demographic characteristics

Population demographic characteristics for the loggerhead turtle (as for most marine turtles) is generally described through the female nesting population which may give an indication of 'fecundity rates'⁴⁹. The Loggerhead turtle is a long-lived species, characterised by high fecundity rates but very low survival rates, as well as delayed sexual maturity.

The Mediterranean population seems to have a significantly smaller adult size in comparison with other populations around the world^{50,51}. This may be due to earlier sexual maturation, slower growth, or both. Studies carried out between 1986-2007 indicate that turtles in the Mediterranean generally take 16-28 years to reach a Curved Carapace Length (or CCL) of 66.5-84.7cm, depending on the nesting site and year^{52,53}. This size range is considered to be the average nesting female size observed at the most important Mediterranean nesting sites and can thus be considered an approximation of the size at maturity. Males appear to reach maturity at 75-80 cm CCL in the Mediterranean⁵⁴.

The CCL of *Caretta caretta* incidentally captured, stranded or sighted in Malta is indicative of the fact that the contingent of turtles passing through Malta are of a much younger size or age class, mostly sub-adults or juveniles. The average CCL calculated from 19 turtles stranded in the period 1999-2002 was about 49.7 cm (range: 34-70cm) and Curved Carapace Width was 42.2 cm (range: 25-66cm). In contrast, Bonett (1982) recounts that in his visits to the local fish market at Valletta he used to encounter many specimens in the 70-80 cm range, which turtles would fall in the adult class. However, the provenance of such specimens is not known.

⁴⁹ Terminology used reflects MSFD indicator 1.3.1

⁵⁰ Dodd, C.K. Jr. 1988. Synopsis of the biological data on the loggerhead sea turtle *Caretta caretta* (Linnaeus 1758). U.S. Fish Wildl. Serv., Biol. Rep. 88(14). Washington, DC;

⁵¹ Margaritoulis, D., R. Argano, I. Baran, F. Bentivegna, M.N. Bradai, J.A. Caminas, P. Casale, G. De Metrio, A. Demetropoulos; G. Gerosa, B. Godley, J. Houghton, L. Laurent and B. Lazar (2003). Loggerhead turtles in the Mediterranean Sea: present knowledge and conservation perspectives. In: A.B. Bolten and B. Witherington (eds.), *Loggerhead Sea Turtles*, pp. 175-198. Smithsonian Institution Press, Washington, DC, USA.

⁵² Casale P., Mazaris AD., Freggi D., Vallini C & Argano R (2009). Growth rates and age at adult size of loggerhead sea turtles (*Caretta caretta*) in the Mediterranean Sea, estimated through capture-mark-recapture records, *Scientia Marina* **73**(3) 589-595, Barcelona (Spain), ISSN: 0214-8358

⁵³ Margaritoulis, D., R. Argano, I. Baran, F. Bentivegna, M.N. Bradai, J.A. Caminas, P. Casale, G. De Metrio, A. Demetropoulos, G. Gerosa, B. Godley, J. Houghton, L. Laurent and B. Lazar. 2003. Loggerhead turtles in the Mediterranean Sea: present knowledge and conservation perspectives. In: A.B. Bolten and B. Witherington (eds.), *Loggerhead Sea Turtles*, pp. 175-198. Smithsonian Institution Press, Washington, DC, USA.

⁵⁴ Casale, P., D. Freggi, R. Basso and R. Argano (2005). Size at male puberty, sexing methods, and adult sex ratio in loggerhead turtles (*Caretta caretta*) from Italian waters investigated through tail measurements. *Herpetol. J.*, 15: 145-148

Further data needs to be collected with respect to the age-class or size-class structure of loggerhead turtles in Malta to enable the assessment of the turtle populations in terms of such parameters.

Sex ratio is considered an important variable when studying the population dynamics of marine turtles, however, data on this parameter is not available for loggerhead turtles in Malta. Studies on sex ratio have been carried out at a regional scale on juvenile turtles⁵⁵, the results of which imply the predominance of females (54.2% of the whole sample) within 4 different areas of the Mediterranean region (including the central area near Malta). Such predominance of female turtles however is not deemed to be significant.

1.4 Green Turtle – *Chelonia mydas*

While green turtles have been reported from Malta^{56,57,58}, this species is quite rare locally and known only from one record in 1929⁵⁹. On the other hand, in the past 2-3 years some other specimens have been sighted by non-governmental organisations (BirdLifeMalta and Nature Trust Malta - Ben Metzger & Vince Attard, Personal Communication) during their surveys at sea and from information forwarded by fishermen.

According to Baldacchino and Schembri, 2002⁶⁰ this species may be under-recorded by local fishermen due to its resemblance to *Caretta caretta*. On the other hand, no strandings or incidental by-catch of green turtles were encountered in recent years. The absence of by-catch incidences of this species could also be due to the herbivorous nature of adults, as a consequence of which, they are less likely to be caught by long-line fishing.

It is also interesting to note that the foraging grounds of green turtles are usually different than those for loggerhead turtles. Green turtles usually start grazing on *Posidonia oceanica* and *Cymodocea nodosa* meadows. When they reach 30-40cm in length, they abandon the pelagic stage and descend to their foraging grounds⁶¹, which are known to occur mainly in

⁵⁵ Casale, P.; Lazar, B.; Pont, S.; Tomás, J.; Zizzo, N.; Alegre, F.; Badillo, J.; Di Summa, A.,; Freggi, D.; Lackovic, G.; Raga, J.A.; Rositani, L. & Tvrtkovi, N. 2006. Sex ratio of juvenile loggerhead turtles *Caretta caretta* in the Mediterranean Sea. *Inter Research Marine Ecology Progress Series* MEPS 324:281-285 (2006) - doi:10.3354/meps324281

⁵⁶ Groombridge, B., 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. *Nature and Environmental Series* no. 48. Council of Europe.

⁵⁷ Brongersma L.G. and Carr. A.F. 1983. *Lepidochelys kempi* (Garman) from Malta. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen. Series C.* 86 (4).

⁵⁸ Gramentz, D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol 1. Nos 4, 1989.

⁵⁹ Margaritoulis, D., R. Argano, I. Baran, F. Bentivegna, M.N. Bradai, J.A. Caminas, P. Casale, G. De Metrio, A. Demetropoulos, G. Gerosa, B. Godley, J. Houghton, L. Laurent and B. Lazar. 2003. Loggerhead turtles in the Mediterranean Sea: present knowledge and conservation perspectives. In: A.B. Bolten and B. Witherington (eds.), *Loggerhead Sea Turtles*, pp. 175-198. Smithsonian Institution Press, Washington, DC, USA.

⁶⁰ Baldacchino A. E. & Schembri P.J. 2002. Amfibji, Rettili, u Mammiferi. *Sensjela Kullana Kulturali- Pubblikazzjoni Indipendenza- PIN.*

⁶¹ Demetropoulos, A. (2011) Guidelines for setting up and management of protected areas for marine turtles in the Mediterranean, UNEP, MAP, RAC/SPA, 2011

the Levantine Basin⁶², extending as far as the central Mediterranean, off Greece and Libya⁶³. Scarce records of this species in Malta could thus be attributed to the fact that the waters lie at the boundary of the distributional range of this species.

1.5 Other species

Records of the leatherback turtle (*Dermochelys coriacea*), Hawksbill turtle (*Eretmochelys imbricata*) and Kemp's Ridley (*Lepidochelys kempfi*) exist for Malta. The following provides a brief indication of the records of these marine turtles. These species will not be considered further in this report since their presence is most probably incidental and functional range of these species would not include Malta.

- The Leatherback turtle has been recorded on several occasions with at least 12 records of sightings and/or captures in Malta mostly in the period 1970-1980^{64,65,66,67} (Table 3).
- Figure 8 indicates the location of a single sighting of leatherback turtle by BirdLife Malta in 2013.
- A hawksbill turtle (*Eretmochelys imbricata*) was recorded in 1980 some five miles off the East coast of Gozo⁶⁸. According to this author, it is likely that this specimen came from the Indian Ocean through the Suez canal.
- The first record of the Kemp's Ridley (*Lepidochelys kempfi*) in the Mediterranean was from Malta. This was a specimen captured off the north-eastern coast of Malta in 1929, one mile from the Grand Harbour⁶⁹. Despott (1930a,b) had erroneously identified this specimen as *Chelonia mydas*. The specimen, which was stuffed and preserved and is presently at the Natural History Museum in Mdina, was identified correctly in 1983⁷⁰. Carr (1963)⁷¹ included Malta as a locality of the Kemp's Ridley in a distributional chart.

⁶² Demetropoulos, A. & Hadjichristophorou M., 1995 Manual on Marine Turtle Conservation in the Mediterranean. UNEP (MAP/SPA) IUCN/CWS/Fish Dept. Manre (Cyprus)

⁶³ Margaritoulis D., and Teneketzis K., (2003) Identification of a developmental habitat of the green turtle in Lakonikos Bay, Greece. Pages 170-175 in Margaritoulis D. & Demetropoulos, A. (editors) 2003 . Proceedings of the first Mediterranean Conference on Marine Turtles. Barcelona Convention-Bern Convention-Bonn Convention (CMS). Nicosia, Cyprus. 270 pp

⁶⁴ Lanfranco. G. 1977. The Leathery Turtle, a rare Animal in the Maltese waters. Times of Malta, 25th July 1977, Progress Press, Valletta, Malta: 5.

⁶⁵ Lanfranco G. 1983. Landings of *Dermochelys coriacea* Linn [Reptilia, Dermochelidae] in Malta [Central Mediterranean]. The Central Mediterranean Naturalist, Vol. 1. (2) 1983. Lanfranco gives a list of 8 specimens encountered

⁶⁶ Gramentz D. 1989. Marine Turtles in the Central Med Sea. Centro, Vol 1. Nos 4, 1989.

⁶⁷ Baldacchino A. E. and Schembri P.J. 1993. Ir-Rettli u l-Amfibiji tal-Gzejjer Maltin. Valetta, Malta: Society for the Study and Conservation of Nature- SSCN.

⁶⁸ Gramentz D. 1989. Marine Turtles in the Central Med Sea. Centro, Vol 1. Nos 4, 1989 and Vella Gaffiero pers comm to this author .

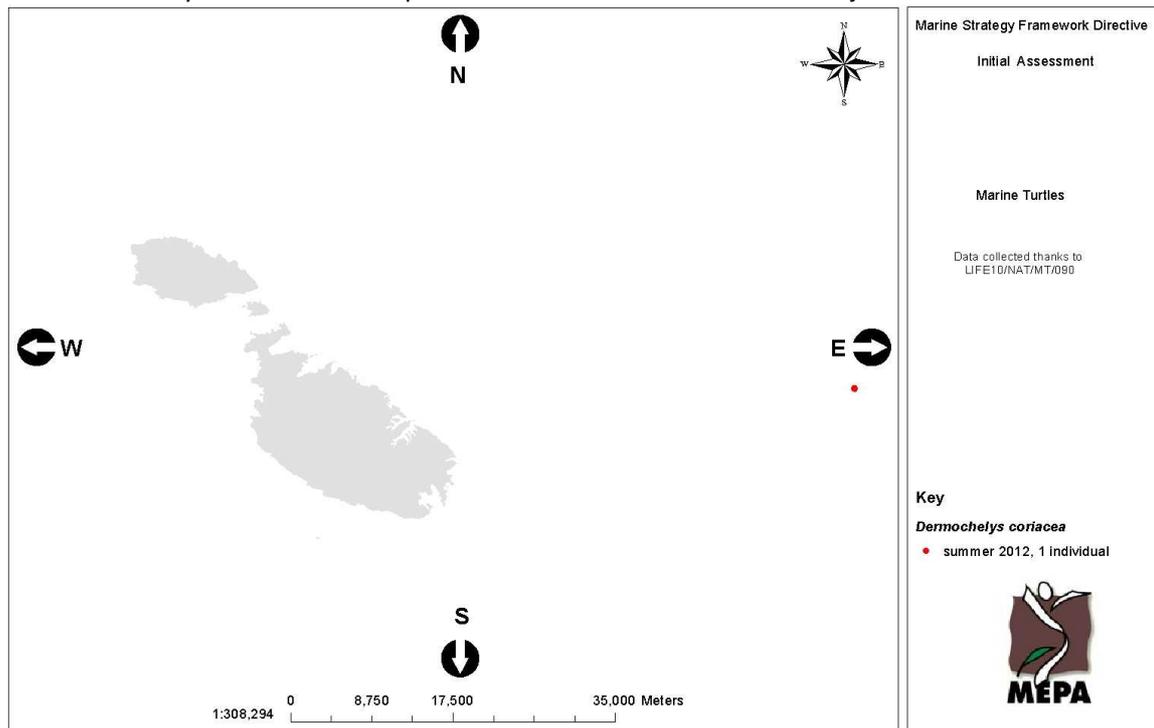
⁶⁹ Brongersma L.G. & Carr. A.F. 1983. *Lepidochelys kempfi* (Garman) from Malta. Proceedings of the Koninkjke Nederlandse Akademie van Wetenschappen. Series C. 86 (4).

⁷⁰ Brongersma L.G. & Carr. A.F. 1983. *Lepidochelys kempfi* (Garman) from Malta. Proceedings of the Koninkjke Nederlandse Akademie van Wetenschappen. Series C. 86 (4).

Table 3: Published data on sightings, incidental captures and strandings of *Dermochelys coriacea* as extracted from Lanfranco (1983)⁷² and Gramentz (1989)⁷³.

Date	Location	Notes
5th August 1970	Zurrieq (South Malta)	Injured turtle
22nd March 1972	Zurrieq	
9th October 1975	Strand Sliema (NE Malta)	Sighting
13th May 1976	M'Xlokk (SE Malta)	Sighting
3rd July 1976	Off Filfla	Captured
August 1976	8 nautical miles South-East Delimara point	Sighting
9th November 1976	Gozo (NW Malta)	
3rd June 1977	Spinola (NE Malta)	
13th July 1977	M'Xlokk	Captured
November 1978	70 n miles South of Malta	Entangled in ropes
July 1979	10 n miles South-East of Malta	Captured
End July 1980	81 n miles South-East of Malta	Entangled

Figure 8: Location of a single sighting of an individual of *Dermochelys coriacea* in 2012. This record was collected by BirdLife Malta as part of the EU LIFE+ Malta Seabird Project.



⁷¹ Carr, A., 1963. The Reptiles Series: LIFE Nature Library

⁷² Lanfranco G. 1983. Landings of *Dermochelys coriacea* Linn [Reptilia, Dermochelidae] in Malta [Central Mediterranean]. The Central Mediterranean Naturalist, Vol. 1. (2) 1983.

⁷³ Gramentz D. 1989. Marine Turtles in the Central Med Sea. Centro, Vol 1. Nos 4, 1989

1.6 Pressures

1.6.1 Pressures on nesting grounds

(i) *Anthropogenic disturbance*

The Maltese sites where turtles were reported to have nested in the past have been abandoned, mainly as a result of disturbance from anthropogenic activities and coastal development in the past century. The intense use of beaches for recreational purposes (particularly during the summer months) and coastal development have led to an increase in artificial lighting and noise levels at these sites thus creating highly unfavourable conditions for turtle nesting⁷⁴. The recent nesting event might have been an attempt of the loggerhead female turtle to nest in a new area.

The sediment dynamics of sandy beaches can also be affected by coastal development, potentially resulting in changes in the granulometry or sediment composition. Such changes could negatively affect potential nesting sites for turtles.

(ii) *Exploitation*

Direct exploitation of turtles used to take place in the past⁷⁵. Deidun and Schembri (2005)⁷⁶ make reference to the collection of turtle eggs as recounted by a local. There are no other 'official' records of turtle egg exploitation, however many fishermen recount that they used to search and look for deposited eggs (Darrin Stevens, personal communication).

1.6.2 Pressures at sea

(i) *Incidental catch by Fisheries*

At present, the major threat to marine turtles is incidental capture by fisheries, almost exclusively through long-line fishing. From a recent review of turtle by-catch data, the annual estimate for the Mediterranean basin may be above 132,000 (all species, sizes and origins combined) with equally high mortality rates (possibly 44,000 deaths)⁷⁷.

⁷⁴ Mifsud C. & Baldacchino A.E (2002) Action Plan for the Conservation of the Maltese turtles. Report prepared for the Regional Activity Centre - Specially Protected Areas (RAC/SPA), Tunis, UNEP Mediterranean Action Plan. Unpublished report.

⁷⁵ Groombridge. B. 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. Nature and Environmental Series no. 48. Council of Europe.

⁷⁶ Deidun, A. & Schembri, P.J., 2005. *A report of nesting on a Maltese beach by the loggerhead turtle *Caretta caretta* (Linnaeus, 1758)(*Reptilia: Cheloniidae*)*, The Central Mediterranean Naturalist Volume 4 (Part 2): 137138.

⁷⁷ Casale P. 2011. Sea turtle by-catch in the Mediterranean. *Fish and Fisheries* 12: 299-316. 469k

Incidental captures of marine turtles from Malta in the past are described in a number of publications. Gramentz (1988)⁷⁸ estimated that 2000-3000 loggerheads were caught on longline hooks around the Maltese Islands during the swordfish fishing season (spring-summer); Groombridge (1994)⁷⁹ published an estimate of 1000-2000 turtles caught annually in the 1990s. This relatively high rate of by-catch of marine turtles is also implied by Gramentz (1989)⁸⁰, who states that in one instance, the author bought (from fish markets), tagged and released 101 loggerheads during one summer. The highest numbers of incidentally captured marine turtles were generally reported between June and September, which coincides with the maximum fishing activity for swordfish, tuna and dolphin fish⁸¹. Bonett (1982)⁸² argues that the high rate of by-catch during this period could also be due to the fact that turtles may be migrating through Maltese coastal waters during this time, making the number of specimens available larger than at other times of the year.

More recent published data by Casale, 2011⁸³ indicates that the number of turtles incidentally caught yearly by Maltese fishing gear, estimated through an indirect approach, is 3,240 individuals. Pelagic longlining accounts for 96% of this bycatch. Turtle by-catch from bottom trawling is estimated at 8 turtles/year, from demersal long-liners at 286 turtles/year and from set-nets at 185 turtles/year. Another set of data for 2006 published by the same author⁸⁴ on the basis of the EU fleet register data, estimates the total by-catch of marine turtles for pelagic long-liners for Malta at about 2,965 individuals per year. Data on turtle by-catch from blue-fin tuna long-lining fishing, obtained through direct methods of assessment, has been published by Burgess *et al.* (2009)⁸⁵. The authors state that the number of turtle individuals caught as non target species by this type of fishing activity were the most abundant with values of 40.3% of the total catch in numbers and 7.3% of the total catch in weight.

Data on turtle by-catch per unit effort of surface long-lining as collected by fishermen and/or onboard observers by Fisheries officers is shown in Figure 6 and Figure 7 for 2008-2011. The mean number of turtles incidentally caught per year based on fishermen's reports in the period 2008-2010, is approximately 58 turtles per year, which is a much lower number than that estimated in the publications quoted above. On the other hand, stranded turtles showing evident signs of damage from fishing lines and turtles incidentally captured by fishermen and landed for rehabilitation purposes, are still relatively frequent.

⁷⁸ Gramentz D. 1988. Involvement of Loggerhead Turtles with plastic, metal and hydrocarbon Pollution in the Central Mediterranean. *Mar Pollut. Buill.*, 19 (1): 11-13.

⁷⁹ Groombridge. B. 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. *Nature and Environmental Series no. 48.* Council of Europe.

⁸⁰ Gramentz D. 1989. Marine Turtles in the Central Med Sea. *Centro*, Vol 1. Nos 4, 1989.

⁸¹ Groombridge. B. 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. *Nature and Environmental Series no. 48.* Council of Europe.

⁸² Bonett, G. 1982. Loggerhead turtles in Maltese waters. *Potamon* 9:107-109.

⁸³ Casale P. 2011. Sea turtle by-catch in the Mediterranean. *Fish and Fisheries* 12: 299-316. 469k

⁸⁴ Casale, P. (2008) *Incidental Catch of Marine Turtles in the Mediterranean Sea: Captures, Mortality, Priorities.* Vol., WWF, Italy, Rome.

⁸⁵ Burgess E, Dimech M., Caruana R., Darmanin M., Raine H., and Schembri PJ., Non Target By-Catch in the Maltese Bluefin Tuna (*Thunnus thynnus*) longline fishery (central Med), SCRS/2009/059.

Damage to turtles by fishing lines is mainly related to permanently damaged or severed limbs, which in some cases have to be amputated for rehabilitation purposes.

(ii) *Habitat Degradation*

Contamination of the marine environment by hazardous substances, physical disturbance through underwater noise and marine litter are considered to constitute significant threats to marine turtles. Turtles which have been injured through entanglement with marine litter have been collected on a number of occasions for rehabilitation purposes.

Gramentz (1986⁸⁶, 1988⁸⁷) refers to observations of loggerhead turtles in Malta contaminated with tar, plastic and metal litter. Twenty out of 99 loggerhead turtles captured incidentally on swordfish longlines and examined in 1986 were found to be contaminated, 17 with crude oil and a few with discarded plastic or metal objects. The effect of oil pollution is not known in detail, although small individuals can clearly be immobilised and exhausted by heavy contamination⁸⁸.

Degradation of marine habitats which constitute foraging areas for marine turtles, as well as the potential depletion of the food resource caused by direct or indirect fishing activities also constitute a threat to marine reptiles. Most marine turtles depend on algal beds, sea grasses and/or reef habitats for food and refuge. The degradation of such habitats is considered to be a serious threat to marine turtle stocks.

(iii) *Anthropogenic Disturbance*

Marine turtles are also known to be injured or killed through collisions with marine vessels. Gramentz (1989)⁸⁹ and Bonett (1982)⁹⁰ report on specimens of marine turtles which had different types of injuries resulting from possible boat collisions. Recreational equipment such as jet skis also pose a danger due to collisions and harassment. Disturbance by vessels or other sea-craft may also disrupt the normal behaviour of the marine turtles especially during mating, feeding or other delicate periods or phases.

⁸⁶ Gramentz D. 1986 Loggerhead turtles at Lampedusa, Italy. *Marine Turtle Newsletter*, 36:3.

⁸⁷ Gramentz D. 1988. Involvement of Loggerhead Turtles with plastic, metal and hydrocarbon Pollution in the Central Mediterranean. *Mar Pollut. Buill.*, 19 (1): 11-13.

⁸⁸ Gramentz D. 1988. Involvement of Loggerhead Turtles with plastic, metal and hydrocarbon Pollution in the Central Mediterranean. *Mar Pollut. Buill.*, 19 (1): 11-13.

⁸⁹ Gramentz D. 1989. *Marine Turtles in the Central Med Sea. Centro*, Vol 1. Nos 4, 1989.

⁹⁰ Bonett, G. 1982. Loggerhead turtles in Maltese waters. *Potamon* 9:107-109.

(iv) *Exploitation*

Intentional captures of marine turtles used to occur quite frequently in the past, either for human consumption or for the production of artisanal products. Groombridge (1994)⁹¹ recounts that large numbers of loggerheads were caught at sea either as target species or as by-catch between August and November, and estimates that 500-600 loggerheads were killed every year to be used as food. Direct exploitation of marine turtles has completely ceased following legal protection of marine turtles coupled to enforcement and awareness campaigns.

1.7 Assessment of Status

The assessment of status of marine turtles in Malta on the basis of the MSFD criteria and indicators for Descriptor 1 was hampered by the currently limited data available. The data available to date, which is mainly based on sightings or collection of injured or incidentally caught turtles, can shed light on the status in terms of distributional range (Indicator 1.1.1) and population abundance (Indicator 1.2.1). However such status can mostly be inferred and standard methodologies for the determination of distributional range and population abundance, as defined for the purposes of the Habitats Directive by Article 17 guidance document⁹² cannot be fully applied at this stage. Therefore assessment of status is heavily based on expert judgement through extrapolation from the currently available data.

The MSFD indicators on population condition (Indicator 1.3.1) cannot be applied at this stage in view of the limited data availability.

As indicated in this report, marine reptiles in Malta and surrounding waters are represented by one species: *Caretta caretta*. Therefore assessment of status at the functional group level is actually reflecting the status of *Caretta caretta*. Within this context, MSFD indicator 1.6.2 with respect to relative abundance and/or biomass was not deemed relevant and assessment of status at the functional group level was mainly based on species composition.

1.7.1 Assessment Area

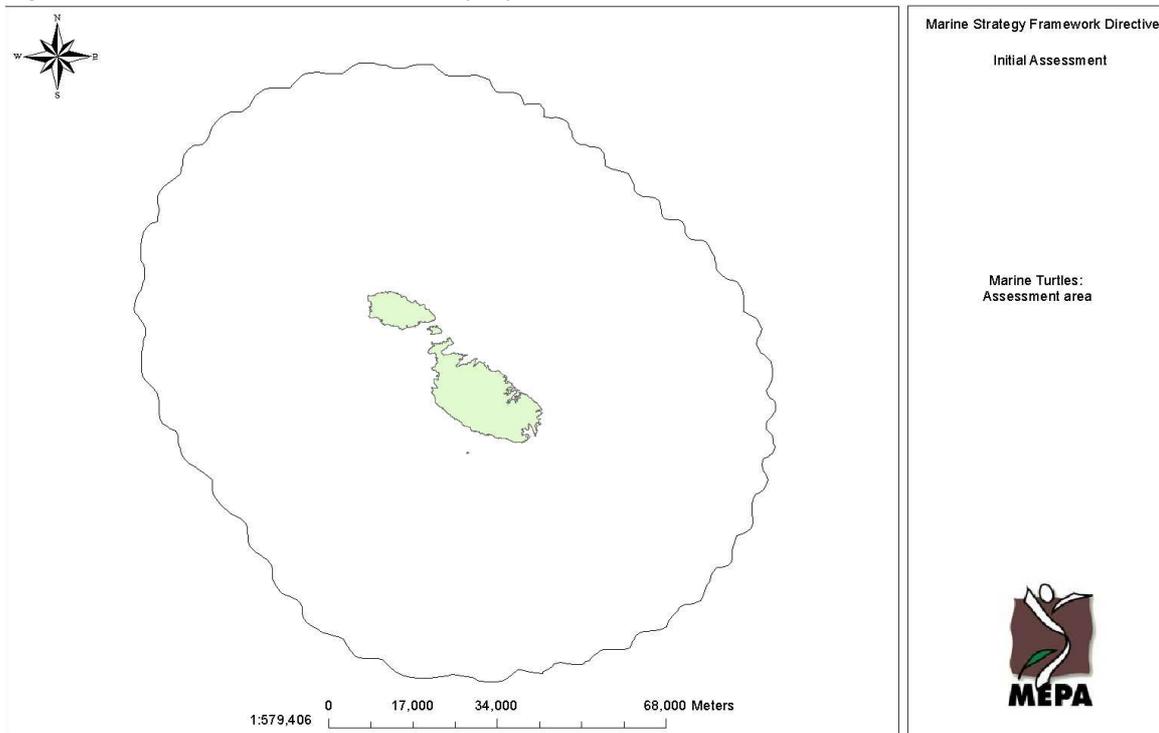
The assessment area used for determining status of marine reptiles on the basis of the existing data is indicated in Figure 9. This area represents the extent of marine waters for

⁹¹ Groombridge, B. 1994. Marine Turtles in the Mediterranean: distribution population status, conservation. Nature and Environmental Series no. 48. Council of Europe.

⁹² Evans D., & Arvella M. (2011), Assessment and reporting under Article 17 of the Habitats Directive Explanatory Notes & Guidelines for the period 2007-2012 Final version, July 2011

which data on *Caretta caretta* is currently available and hence for which assessment of status was possible.

Figure 9: Assessment area used for the purposes of assessment of status of marine turtles.



1.7.2 Status – *Caretta caretta*

The 2012 sightings data confirmed that *Caretta caretta* occurs throughout the whole extent of the assessment area. This implies that the assessment area forms part of the natural distributional range of this species within the Mediterranean region, hence the distribution of *Caretta caretta* in the assessment area is deemed to be in line with natural physiographic, geographic and climatic conditions. While no systematic data on sightings of this species is available, records of *Caretta caretta* in the past years imply the constant presence of this species in Malta. This, coupled to expert judgement, indicate that this species' distribution within the assessment area was stable throughout the past years. In this regard, the status of *Caretta caretta* in terms of its range within the assessment area is considered to be 'good'.

By-catch data per unit effort of long-line fishing indicates that the frequency of *Caretta caretta* individuals caught incidentally throughout the past years is relatively constant, with the exception of peaks in September – October 2008. This data implies that there was no

significant decline in the population abundance of this species in the assessment area. Nevertheless, such inference is not deemed robust enough to determine status of *Caretta caretta* in terms of population size.

The overall status of *Caretta caretta* has not been assessed in view of insufficient data in terms of population size and condition.

1.7.3 Status – Functional Group

Marine reptiles in the assessment area are represented by a single species: *Caretta caretta*. Noting that:

- (i) current data points towards the fact that Malta lies at the boundary of the natural distributional range of *Chelonia mydas*; and
- (ii) the other three turtle species recorded in the Mediterranean only occur as 'stragglers' in Malta and some occurrences are a result of accidental entries from the Atlantic,

this species composition of marine reptiles in the assessment area is deemed to be in line with natural physiographic, geographic and climatic conditions. In this regard, the status of the functional group is deemed to be 'good', however, such status would need to be re-affirmed or otherwise, once further data is available with respect to the condition of the population of *Caretta caretta* in the assessment area.

1.8 Data Gaps

Data gaps for marine turtles are mainly attributed to the limited systematic monitoring of this species group in Malta. At present, long-term data on turtle sightings, on the basis of which species distribution and abundance can be assessed, is lacking. Furthermore, data collection with respect to population condition (through measurement of demographic characteristics) is currently carried out on an *ad hoc* basis depending on the collection of incidentally caught and/or injured specimens or on standings. Such data gaps could be addressed through the establishment of a systematic data collection process aimed at assessing the population status of marine turtles in Malta.