



ALBATROS PROJECT

MONOGRAPH

2012



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THE LESSER CRESTED TERN, *Sterna bengalensis* State of knowledge and conservation in the Mediterranean Small Islands

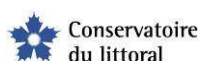
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ABSTRACT

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Information on the Mediterranean breeding population of Lesser Crested Tern *Sterna bengalensis* has increased steadily during the last five years, as a result of the initiation of a regular monitoring and ringing program at the breeding sites of the Libyan coast. This program is supported and coordinated by Environment General Authority (Libya) and the Regional Action Center for Specially Protected Areas (UNEP-MAP-RAC/SPA) with additional support by Istituto Superiore per la Protezione et la Ricerca Ambientale (Italy), Conservatoire du Littoral (France), BirdLife Malta, Station biologique de la Tour du Valat (France), Zueitina Oil Company (Libya) and Office National de la Chasse et de la Faune Sauvage (France).

As a priority species of the Mediterranean Seabirds Action Plan and the Mediterranean Small Island Initiative (PIM), the update of information will be compiled in the form of a species monograph, presenting known and updated information on the species at both breeding and stop-over sites, through data obtained by regular breeding sites monitoring, sightings along the north-western African migration route, and other sightings at wintering areas in West Africa. The monograph will include basic information on the ecology and biology of the species (nest shape, nesting habitat description, feeding behaviour and diet information, etc.), in addition to the assessment of the population trends and conservation status. It emphasizes on proposed conservation actions required to maintain the population size in the Mediterranean through further studying and protecting breeding and stop-over sites against various anthropogenic and natural threats this concentrated population is facing at the short and long term.

The Mediterranean Small Islands Initiative (PIM):

The Conservatoire du littoral has been coordinating, since 2005, an international program for the promotion and assistance for the management of Mediterranean insular micro-spaces, known as the PIM Initiative for the Mediterranean Small islands, which is co-financed by the Fonds Français pour l'Environnement Mondial (FFEM) (French Global Environment Facility), the Agence de l'Eau Rhône Méditerranée et Corse and the city of Marseille. The PIM initiative is developing a mechanism for the exchange and sharing of knowledge which is necessary for the emergence of good management practices of exceptional spaces. The Albatross project has been set up within the framework of this program to enhance the knowledge of Mediterranean nesting bird species. To update the knowledge on these species, the PIM initiative has coordinated the preparation of monographs for each of the project species.

L'Initiative pour les Petites Iles de Méditerranée.

Depuis 2005, le Conservatoire du littoral coordonne un programme international de promotion et d'assistance à la gestion des micro-espaces insulaires méditerranéens, baptisé Initiative PIM pour les Petites Iles de Méditerranée, co-financé par le Fonds Français pour l'Environnement Mondial (FFEM), l'Agence de l'Eau Rhône Méditerranée et Corse et la Ville de Marseille. L'Initiative PIM développe un dispositif d'échange et de partage des connaissances nécessaires à l'émergence de bonnes pratiques de gestion sur des espaces exceptionnels. Dans le cadre de ce programme, le projet Albatros vise notamment à améliorer les connaissances concernant les espèces d'oiseaux nicheurs de Méditerranée. Afin de fournir un état des connaissances actualisé concernant ces espèces, l'initiative PIM a donc coordonné la réalisation de ces monographies qui doivent à terme servir de document d'aide à une réflexion sur la conservation de ces espèces au niveau méditerranéen.

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Citation.....	2
ABSTRACT	2
CONTEXT	3
INDEX	4
GENERAL DATA	5
DESCRIPTION OF THE SPECIES	5
ECOLOGY AND HABITAT	7
DISTRIBUTION OF POPULATIONS	8
BREEDING MONITORING	11
MAIN THREATS IDENTIFIED IN SMALL ISLANDS.....	13
CONSERVATION STAKES, CURRENT AND OLD CONSERVATION.....	13
PROGRAMS CARRIED OUT ON MEDITERRANEAN SMALL ISLANDS.....	13
CONSERVATION ACTION PROPOSALS FOR MEDITERRANEAN SMALL ISLANDS.....	15
REFERENCES	18

Scientific Name: *Sterna bengalensis* Lesson, 1831

Synonym in use: *Thalasseus bengalensis*

Subspecies: *Thalasseus bengalensis emigrata* / *Sterna bengalensis emigrata*

French name : Sterne voyageuse

Spanish name: Charrán Bengalí

Name in Arabic: خطاف بحر متوج صغير

Italian name : Name in Italian: Sterna di Rüppel



Protection Code:

IUCN: Least Concern

AEWA : AEWA: Annex II

Référentiel taxonomique : Taxonomic reference: Del Hoyo *et al.*, 1996

Barcelona Convention : Annex II

DESCRIPTION OF THE SPECIES

▪ Individual characteristics:

- 35-37 cm (bill 5.0-5.7 cm; legs 2.4-2.6; tail in adults 13-14 cm, in juveniles 10cm). Wing spans 94-105.
- Adult weight ranges between 185-190 for males and 205-235g for females (Britton 1970). Average weight ca 240 (Serventy, *et al.*, 1971)
- Slender long pale orange-yellow bill (during breeding), yellow bill in the rest of the year, slightly drooping.
- Pale blue-grey mantle, rump and tail contrasting with paler silvery-white primaries (during breeding plumage)
- Sexes are similar.

▪ Aspects of the moults

Adults (Post-breeding)

Moult Complete; inner or central primaries falls, and some head feathers and scapulars from late July or August; white feathers appears near bill base, from May or during breeding season. Moult of tail and most of the body complete in October-November. Inner primers continue to moult gradually through December and in January all inners become replaced with new ones (Olsen and Larson, 1995).

Adults (Pre-breeding)

Involves head, underparts, part of mantle and scapulars, tail, and inner primaries. Starts with p1 between late November and late January; head and body from late February; completed mid-March to early April, when primary moult arrested with inner (4–) 5–6 primaries new (Cramp, 1985).

Post Juvenile

Complete. Starts November– January with head, body, central tail-feathers, and inner primaries. Mostly in

1st immature non-breeding by March–April, but outer primaries not until July–August (Cramp, 1985).

First Immature (Post-breeding)

Complete; as no 1st immature breeding attained, 1st immature non-breeding replaced directly by 2nd immature non-breeding. Inner primaries start May–July (before previous post-juvenile moult in outer primaries completed); all head, body, and tail new by October, outer primaries and inner secondaries by January–April. In contrast to adults, primary moult only occasionally suspended in early summer. Following pre-breeding and subsequent moults like adult (Cramp, 1985).



(source: Olsen and Larsson, 1995)

Slighter and usually smaller than Sandwich Tern *S. sandvicensis*, and much smaller than both Royal Tern *S. maxima* and Swift Tern *S. bergii*. Within the species, the Mediterranean population is distinctly larger and the upperparts are much paler than nominate *bengalensis* from eastern and southern India, Ceylon, and westward to East Africa, and the nominate *torresi* from Australia. The breeding population in Red Sea and the Gulf region is a transitional form between Mediterranean population and *bengalensis*.



Coupling flights (A. Hamza ©)

▪ Description of the flight

Fast flights similar to common tern's *S. hirundo*. With particular acrobatic and vocalized flight patterns during pre-nesting period (high flights of couples)



Adult shading 2-day hatched chick, Garah, Libya (A. Hamza ©)

▪ Description of the voice

Calls of adults and young apparently very similar to Swift Tern *S. bergii* though higher pitched Advertising-call, rendered 'kirrit', 'kriik' while fishing. (Cramp, 1985)

Reproduction

Eggs are laid on open bare soil, ridges, or on soil surrounded by vegetation; the nest is shallow scrap, occasionally edges may be consolidated by adult droppings (Elba, Libya: Hamza, unpublished), and some nests may contain few sea shells and debris (Garah island, Libya).

Nests are made on the bare ground, on islands on upper sandy beaches (especially low lying islands, with sparse vegetation or coral islands with bare soil), near the shores, possibly to offer an easy escape way to water for juveniles. Wherever tide movements are significant, nests established further away from beach. Some colonies may occur at the centre of the island, near salt marshes connected to the sea (Elba island colony). On islets inside lagoons, nests are made also at a few cm from the water edge (Benghazi, Libya).

The Mediterranean population in Libya is moving nesting site from year to year. On Garah Island, nest sites rotated anticlockwise from 2006 to 2010 breeding seasons; at another colony (Elba Island) the colony may split between two adjacent islands, as a potential response to disturbance.

Colony size varies from small groups of few couples (Elba) to thousands (Garah), the clutch size is commonly of 1 egg, with small percentage of adults that lay 2 eggs.

Replacement laying of eggs is common in the Gulf region population (*S. b. torresii*), but it was not noticed in Mediterranean population.

Behavior and diet

Fish feeder in both shallow and deep waters by plunge-diving. Picks surface fishes like Sardines or flying fish or juvenile fish of other clupeid like species. Feeds individually, or in a group of 10 to >70 individuals. Some birds can carry 1-4 fish at a time.

Information is scarce about feeding areas for the Mediterranean breeding population, however field observations in Libyan colonies indicates feeding in areas around the colony to areas located at about 10 nautical miles off the colony site.



Adult tern carrying fish to feed its chick, Garah Libya
(A. Hamza ©)

Lesser crested Terns *Sterna bengalensis* can be split into three subspecies: This bird has a number of geographical subspecies, differing mainly in size and minor plumage details (Del Hoyo *et al.*, 1996):

- *S. b. bengalensis*: northern Indian Ocean, Red Sea wintering to South Africa. Medium-dark grey above; slightly smaller.
- *S. b. torresii*: Indonesia south to Queensland, Australia, wintering in the same area (birds breeding in the Persian Gulf are also often given as this race). Dark grey above; slightly larger.
- *S. b. emigrata*: breeding in the Mediterranean only on islands along the coast of Libya. Breeding occasionally in France, Greece, Italy and Spain. Wintering in West Africa. Pale grey above (only marginally darker than Sandwich Tern); slightly larger. Originally described as a new taxon by Nauman in 1934 from a Moroccan specimen obtained on migration. The Mediterranean Lesser Crested Tern *Thalasseus bengalensis emigrata* has the smallest global populations and a very restricted breeding range.

The Mediterranean subspecies (*S. b. emigrata*) is mainly wintering in West Africa (Sierra Leone, Guinea Bissau, Senegal, Gambia, and possibly Ghana), with some individuals in Morocco and Mauritania. There are a series of winter records of this species in Libya (see Meininger *et al.*, 1994) which suggest regular occurrence of isolated individuals in the winter months (Brehme *et al.*, 2003). Three to seven individuals were reported in winter census of waterbirds of Libya between 2007 and 2010 (Hamza & Smart in EGA RACSPA Team 2012).

Below is presented a table outlining the numbers of breeding pairs in Libya and the references corresponding.

Table 1 : Documented breeding population sizes of lesser crested terns by year and site in Libya.

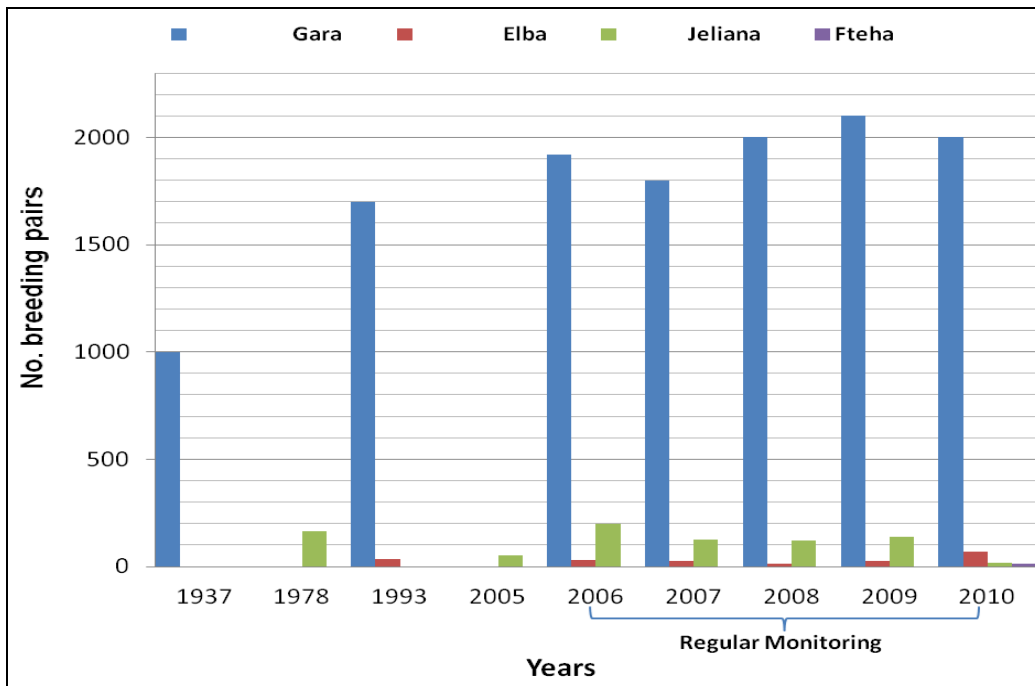
Site/year	1937	1978	1993	2005	2006	2007	2008	2009	2010
Garah	1000		1700		1920	1800	2000	2100	2000
Elba					29	24	14	24	16
Jeliana		164		>50	>200	125	120	140	70
Fteha									12

References of the table:

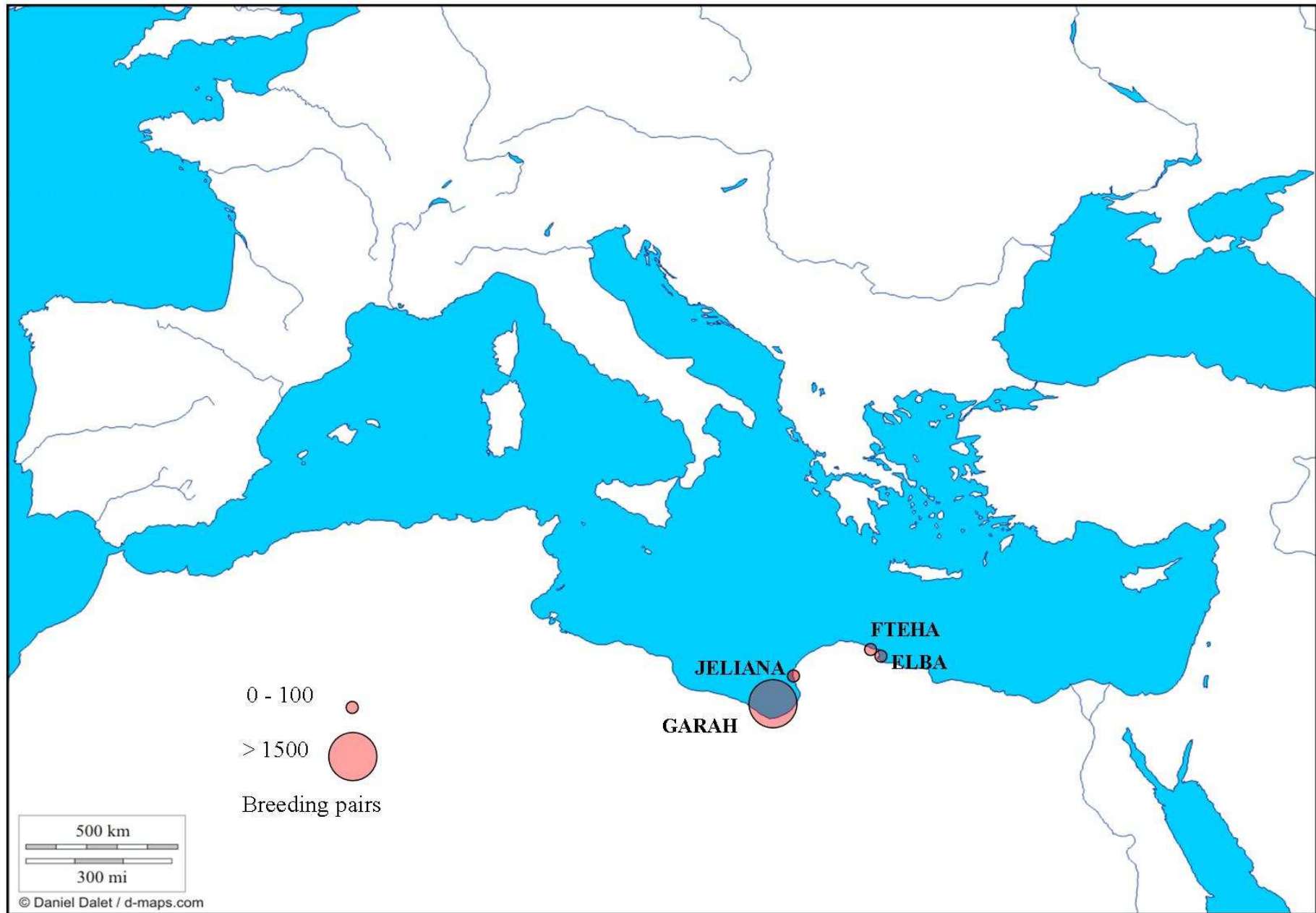
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- 2008-2010** (Hamza, A. 2010, Unpublished data.)

➤ Below is presented a graph presenting the evolution of the breeding pairs by year in Libya.

Graph 1 : Breeding population sizes of lesser crested terns by year and site in Libya.








➤ Next page is presented a map outlining the previous data..



Sterna bengalensis emigrata- Geographical Distribution of the Mediterranean breeding populations– PIM 2012

▪ Breeding/ feeding/roosting sites:

	Site name	Alternative names	Importance to LC Terns	Coordinates	Brief description
1.	Garah Island	Gezeret Garah, LeGarahgh island, Gezerit LeGarah, Gezerit Lahberi, Bird Island, Isola degli Uccelli	Breeding/roosting	30°48N 19°54E	<p>Within the Gulf of Sirte, about 12Km off the coast. Low sandstone cliffs or gentle slopes surrounding low hills with scattered rocks to the north, east and western sides, the southern side with small sandy beach. The island on the top plain has low halophytic plants and aired short shrubs.</p> 
2.	Jeliana islet	Islet inside Sebkhath Jeliana, 'Western lake Sabkhath Julianah	Breeding/roosting	32°05N 20°03 E	<p>A very small low laying islet, ca. 30m², made of stone base with mud and litter accumulations at the middle of the northern part of Sebkhath Jeliana (30ha. permanently flooded salt marsh). In winter it is used by cormorants as roosting site</p> 
3.	Ain Ziana lagoon	Ain Zeiana, Ain Zeiana-el Coefia, Ain Zeiàna, Blue Lagoon, Zayyanah, Zayyānah, Zeiana, Zeiána	Roosting/Feeding	32°12N 20°09E	<p>A 500 ha brackish water lagoon, made of amalgamates of seawater from the northwest with freshwater spring of Ain Ziana to the southwest and northern coasts of the lagoon. The site is important as a fish nursery, and for feeding, wintering and breeding of several sea and waterbird species.</p>

					
4.	Al Elba Island	Jazīrat al `Ulbah, Gezeret Ain al Ghazalah, Gezerit Um Elmaracheb, Gezerit el Elmarakeb, El Maracheb Island Isola el Maràcheb	Breeding/ roosting	32° 14N 23° 17E	<p>Small low lying Island situated in vicinity of the Gulf of Bumba (Fig.9), and 2 km from the mouth of Ain al Ghazalah bay. Halophytes are dominant, with few low shrubs. About 50% is bare area.</p> 
5.	Fteha island	Ftiha Island (Jazirah Al Watyah or Gezira el-Uàtia; Jazirat Ftiha,	Breeding/ roosting	32°23'30.50"N 23° 09'57.92"E	<p>A flat island in the Gulf of Bumbah, unusually ring-shaped, with a wetland inside. Surface area of ca. 6 ha, lagoon included. In 2010 Elba colony split into two, 16 pairs bred here for the first time (Hamza, unpublished data).</p> 

▪ Phenology of the specie and fieldwork periods

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct
Coupling												
Egg laying												
Hatching												
Fledging												

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct
Field presence												
Banding Periods												

MAIN THREATS IDENTIFIED IN SMALL ISLANDS

▪ Identified threats

- After habitat modification (type 1)
- Issue of climate change (type 2)
- Due to overexploitation of resources (type 3)
- Due to pollution (type 4)
- Due to invasive species or introduced (type 5)

Country	Archipelago	Type 1	Type 2	Type 3	Type 4	Type 5
Libya	Garah Island		X	X	X	
	Elba		X	X		X
	Jeliana Islet	X	X	X	X	X
North-west Africa	Wintering area	X		X (tern trapping)	X	X

CONSERVATION STAKES, CURRENT AND OLD CONSERVATION PROGRAMS CARRIED OUT ON MEDITERRANEAN SMALL ISLANDS

▪ Conservation issues identified:

1. Lack of legal protection of the species and its breeding/foraging areas in Libya.
2. Lack of protection enforcement and awareness of the importance of such species as a Mediterranean endangered species.
3. Illegal waterfowl hunting activities, such as at Elba, causing severe disturbance to the colony there.
4. Habitat alteration by development without taking EIA national guidelines in consideration (e.g. Jeliana Lake project, 2010)
5. Illegal blast fishing in the vicinity breeding sites (Garah and Elba islands).

▪ Types of conservation actions implemented to date.

1. Regular monitoring on the Lesser-crested Tern *Sterna bengalensis* is only 5-years old; it is supported and coordinated by EGA and RAC/SPA with additional technical and logistical support by ISPRA, Conservatoire du Littoral, Birdlife Malta, Tour du Valat, Zueitina Oil Company, ONCFS, in the framework of Libya's implementation of the Mediterranean Action Plan for the conservation of marine and coastal birds (UNEP-MAP-RAC/SPA, 2003).

2. The regular monitoring enhanced our knowledge on ecology and biology of the species (A. Hamza is conducting a PhD study on the species in Libya).
3. Colonies were monitored on regular basis between mid July to mid August.
4. Nests located near cliff areas (at Garah) were fenced to protect hatchlings from falling away.
5. As all sites were not legally protected, very limited work was done. And there is a need for immediate enforced protection to maintain the stability in population size.

▪ **Banding Campaigns implemented:**

During 2006-2010 banding campaigns, a total of 1140 nestlings of the species were ringed (ringed) at the three main breeding sites in Libya (see below table). The majority were in Garah (86.4%). Sightings of the juveniles were: Spain (4), Senegal (2), Sierra Leone, Morocco and Libya: One bird each, making a recovery percentage of 0.79% of the total ringed nestlings. None of Elba colony birds were reported.

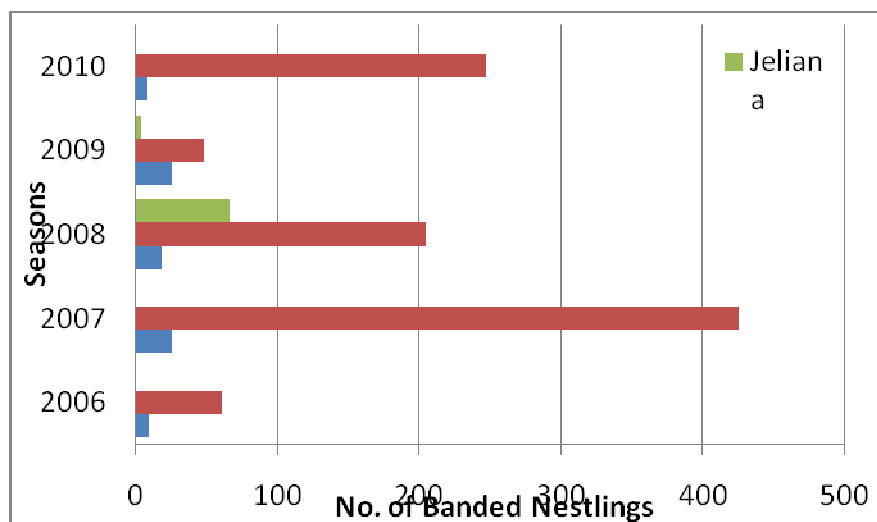
Table of ringing campaigns by year and site:

	2006	2007	2008	2009	2010	Total	Total Sighted
Elba	9*	25	18	25	8**	85	0
Garah	61*	425*	204	48	247***	985	8
Jeliana	0	0	66	4	0	70	1
Total	70	450	288	77	255	1140	9

* Birds banded with Metal rings only.

** One bird banded with metal ring only.

*** 31 birds banded with Metal rings only.



Picture 2: Results of Banding program for lesser crested terns in Libya (2006-2010)

▪ Techniques generally followed for this species

Following the guidelines of working with in tern colonies on small islands, elaborated for the Red Sea region (PERSGA/GEF, 2004) and the UK's Seabird Monitoring Handbook (Walsh *et al.*, 1995), in addition to the recent Guidelines for management plan for coastal and marine important areas to birds and/or marine and coastal Protected Areas (UNEP-MAP-RAC/SPA, 2007), the following techniques were implemented:

1. Preparation of fieldwork trips, by obtaining information about marine weather, logistics to transfer team to breeding sites,
2. The development of specific protocol for fieldwork, including approaching sensitive habitat of breeding, counting techniques for birds and nests, assigning tasks to team members, building corrals, herding crèche of young terns to be ringed individually, within limited period of time, to avoid parent desertion and heat effect on nestlings and un-hatched chicks.
3. Trapping adult birds (during late incubation period) using walk-in traps for measurements and banding.
4. Ongoing study is being conducted now on the Phylogeny of the species in Libya, and its relationship to the breeding population of Red Sea (Egypt) and the Gulf region (Bahrain). The results will reveal the expected independency of the Mediterranean population and when separation of the population occurred (between Libyan and Egyptian breeding population).



CONSERVATION ACTION PROPOSALS FOR MEDITERRANEAN SMALL ISLANDS

▪ Action Plan/ Local level:

Thematic issue 1

Education, Public awareness and local communities participation:

Effective conservation programs should be inclusive to all local authorities and public who live, use or interfere with breeding or foraging sites of the species. Special attention should be paid to fishermen and hunters. Libyan or foreign tourists should be made aware of the sensitivity and fragility of breeding sites.

- **Actions proposed:**

1. Produce and disseminate general education awareness material, about marine and coastal biodiversity of area, and threats faces the target site/s, with some emphases on importance of the locality as one of three main breeding sites for lesser crested tern, on the Mediterranean level.
2. Design awareness activities for target groups (fishermen, and local campers/hunters).
3. Engage youth groups (Libyan Scouts, NGO's and local volunteers) in education programs, and select the best of them to take part in monitoring activities.
4. Work with local authorities to make sure that breeding and known foraging areas are well protected from any development (habitat degradation) or any other human activities.

Thematic issue 2: Site protection and management:

Local authorities should play key role in management and protection of the target site/s. Establishment of Marine Protected Areas (or Important Bird Areas) should take into account local expertise and employ locals to engage them in management and protection of the site as a whole, and sustain lesser crested tern in particular.

- **Actions proposed:**

1. Engage local authorities, tribal structures and NGO's in preparation and implementation of any protection measures (or site management plans) for terns bred within that locality, by forming local task force to work in harmony the national level team.
2. Setup agreed measures to control impacts of human disturbance and control and introduction of any species (by man) to the breeding sites.
3. Enforcement of existing laws that protect wildlife and those related to fishing (problem of blast fishing, and trawling in shallow waters).
4. Revise any existing (or develop) local contingency plans to combat marine pollution (land-based and at sea).
5. Setup an intensive warden control, especially for Elba island colony.

▪ Action Plan/ National level:

Thematic issue 1: Protection of the species

Lesser crested tern is the largest breeding population of any seabird in Libya. The country holds a moral responsibility to maintain the breeding population of the Mediterranean subspecies, and so far (except monitoring and adoption of Mediterranean Action Plan for Seabirds) no actual protection measure was taken.

- **Actions proposed:**

1. Develop national species protection legislation, and emphasise on protection of breeding seabirds and their habitats in particular.
2. Setup a national Action Plan to protect marine birds (Migrant and residents), with emphasis to the Mediterranean Guidelines available, and the Regional Action Plan for seabirds of SPA protocol.
3. Define Garah and Elba islands as Marine Protected Areas as soon as possible, and revise the legal texts regarding marine traffic, oil spills and fishing to take marine birds in consideration.

4. Use the available data to setup a national program to monitor and better protect lesser crested tern colonies and sites.

Thematic issue 2: Education, Public and government awareness

- **Actions proposed:**

1. Organising of awareness campaigns for the general public and towards governmental civil servants prior to and throughout the breeding season of the species on the importance of Libyan small islands to the Mediterranean population of Lesser-crested Tern.
2. Use lesser crested tern as a flagship species for marine bird's conservation activities in Libya.

Thematic issue 3: Cooperation

- **Actions proposed:**

1. Strengthening the existing collaboration with Zueitina oil company to protect and help in monitoring the most important site (Garah island).
2. Continue the banding program of the species, to enhance our understanding to flyways and migration routes and wintering sites.
3. Train Libyan ornithologists to acquire more experiences in seabird monitoring and conservation fields.

- **Action Plan/ Regional level:**

- **Actions proposed:**

1. Work with other Mediterranean states to implement the Action Plan on marine birds listed in SPA protocol, with particular attention to regional actions regards lesser crested tern population.
2. Strengthening regional monitoring activities for sighting ringed lesser crested terns to and from wintering areas.
3. Exchange of information and data regarding movements and identifying both stop-over sites and wintering sites of lesser crested tern along Northwest African coastline.
4. Organize workshops and scientific symposia on Med-marine birds regularly.

- **Improvement of knowledge**

- **Monitoring the Med population: undertaking field surveys of LCT in wintering areas in west Africa and strengthening for the next 3 years the integrated monitoring program currently implemented on the species in Libya.**
- Apply protection status of the species and breeding habitats in Libya: Help the new Libyan authorities to setup national Action plan for protecting lesser crested tern as a national flagship species with regional Mediterranean importance.

- monitoring the Med population: improving field activities on the species by agreeing on a good practice protocol
 - conserving the species: improving protection of breeding islets of the Gulf of Bumbah by setting permanent wardening
 - public and stakeholder awareness: editing an illustrated booklet on islets used by the Lesser-crested Tern in Libya
 - conserving the species: institutional expertise on enhancing coastal areas legal protection tools in Libya
- **This is a priority research for the species at its breeding sites off the Libyan coast. Techniques such as light-weight GPS tracking and intensive boat-based monitoring at sea can help in identifying main feeding areas and distances to the colony site, which would help in drawing precise maps of feeding sites, to be further studied and included in buffer zone of any MPA to be established for the species.**

- **Recommendations for action for better understanding of the species**

The Mediterranean subspecies of lesser crested tern is highly vulnerable as it depends on only one main breeding colony and 2 or 3 significantly smaller colonies. A future conservation strategy should include:

- Revision of taxonomic status of *Sterna bengalensis emigrata* within *Sterna* genus (ongoing study by A Hamza on Phylogeny of the species in Mediterranean, Red Sea and the Gulf region).
- Enforce protection status of the species in Libya and the species flyway countries.
- Identification of breeding, foraging habitat requirements.
- Identification of wintering areas and habitat requirements.
- Intensify monitoring along the flyway from and to breeding sites, and use small islands along the coast of NW Africa to monitor stopping-over sites to be protected as well) being important refueling sites for the population.
- Identification of limiting factors within life cycle.



Fledging in Garah island (27.08.2010), note two juveniles with colour rings at left leg. (A. Hamza ©)

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